Nursing Home Culture Change and its Effect on Quality of Life for Residents

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Abstract

For over two decades, a movement to transform nursing homes (NHs) into person-centered homes, referred to as NH culture change, has been occurring globally and in the United States. This so-called culture change movement strives to improve quality of life (QOL) for people living and working in NHs through a range of innovations that emphasize resident autonomy, home-like environments, staff empowerment, staff leadership, and family and community engagement. NH residents are at high risk for compromised QOL due to a decline in physical and cognitive function, loss of independence and autonomy, interruption of their previous social network, lack of privacy, low self-esteem, and boredom. Culture change practices are promising with respect to improving resident QOL, as they are intended to provide a homelike environment, normalize resident daily life routines, honor resident preferences, and nurture caring relationships. However, sound evidence is lacking for the benefits of culture change practices on resident QOL.

Grounded in perspectives of complexity theory, Diffusion-of-Innovation theory, and Social Production Function theory, this study sought to understand how NH culture change practices affect resident QOL. The aims of this study were the following: (1) describe the implementation of culture change practices in NHs in Minnesota; (2) generate an empirical typology of culture change implementation; (3) examine NH structural and organizational characteristics that are associated with the types of culture change implementation; (4) examine variations in quality outcomes across the types of culture change implementation. The primary outcome is resident QOL, and the secondary outcomes include family satisfaction and clinical quality indicators (QIs); (5) test the

domain-specific relationships of culture change practices with resident QOL and family satisfaction; and (6) examine the moderating effect of small homes or households on these relationships.

This cross-sectional study surveyed NH administrators about culture change implementation. The study sample included all Medicare and/or Medicaid certified NHs (n=363) in Minnesota. Administrative data on NH characteristics and quality outcomes was used. This study generated an empirical typology of culture change implementation based on a latent profile analysis (comprising high performers, average performers, and low performers) that differentiated NHs in Minnesota with regard to levels and patterns of culture change implementation. High performers were distinguished through demonstrating better resident QOL and higher family satisfaction. The in-depth investigation of the domain-specific relationships revealed that the culture change domains for the physical environment, staff empowerment, staff leadership, and end-of-life care were positively associated with at least one specific domain of resident QOL and family satisfaction. Staff empowerment and staff leadership had positive effects on a wider range of resident QOL outcomes ranging from promoting residents' positive experience with day-to-day care to improving psychosocial well-being. Implementing small home and household models had a moderating effect on the relationships between staff empowerment and resident QOL or family satisfaction. Promoting staff empowerment contributed to improved outcomes of resident QOL or family satisfaction for NHs maintaining the traditional architectural structure but declined outcomes for NHs implementing small home or household models.

The findings of this study provide practical implications for NH providers to develop a tailored culture change intervention that best meets the needs of residents, family members, and staff in their facility. The findings also inform policy with regard to resource allocation to support NHs at different levels of culture change implementation to achieve comprehensive culture change.

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List of Abbreviations

NH	Nursing homes
QOL	Quality of life
ADL	Activities of daily living
IADL	Instrumental activities of daily living
QI	Quality indicators
MDS	Minimum Data Set
LPA	Latent class analysis
ANOVA	Analysis of variance
BIC	Bayesian information criterion
FWR	Family-wise error rate

Chapter 1 Introduction

Background

Nursing Home Culture Change

Nursing home (NH) care is an essential component of the long-term care system for older adults, especially for those with cognitive decline and functional impairments. In the United States, approximately 1.4 million residents lived in one of 15,634 Medicare- and/or Medicaid-certified NHs in 2014 (Centers for Medicare and Medicaid Services, 2015; Harris-Kojetin et al., 2016). Nearly 85% of the NH population were over age 65 and 7.8 % were over 95 years (Centers for Medicare and Medicaid Services, 2015). The 2014 national NH data shows two-thirds of residents (63.1%) had four out of five activities of daily living (ADL) impairments and 61.4% had moderate to severe cognitive impairment. The most impaired—those with five ADL impairments as well as severe cognitive impairment represented 14.9% of the NH population. The decline in physical and cognitive function renders NH residents the most vulnerable population who are experiencing diminished quality of life (QOL) due to the loss of independence and autonomy (Kane, 2003; Kane et al., 2003; Shippee, Henning-Smith, Kane, & Lewis, 2015). Moreover, loss of connection to previous social networks and social roles, having to following fixed routines, lack of privacy, low self-esteem, and boredom undermine residents' QOL (Cooney, 2012; Murphy, Shea, & Cooney, 2007; Timonen & O'Dwyer, 2009). Moving to a NH has been considered a stressful life event by most residents as they hardly develop a sense of "home" living in the NH (Cooney, 2012; Koppitz et al., 2017).

To readdress the "home" aspect of NH care instead of the "institution" aspect, the NH culture change movement emerged as a broad-based effort to transform NHs into

person-centered homes (Koren, 2010; Mitty, 2005). Culture change practices in NHs strive to foster a person-centered culture and give voice to people living and working there through a range of innovations that emphasize resident autonomy, home-like environments, staff empowerment, staff leadership, and family and community engagement (Koren, 2010). NH culture change has gained growing recognition in the NH industry globally (Caspar, O'Rourke, & Gutman, 2009; de Rooij, Luijkx, Declercq, & Schols, 2011; Miller et al., 2018; Sjogren, Lindkvist, Sandman, Zingmark, & Edvardsson, 2017). In the United States, NH culture change has become a national campaign supported and promoted by a broad group of stakeholders through a grassroots movement in the 1990s initiated by the Pioneer Network (a leading organization founded by a group of prominent professionals, consumer advocates, researchers, and regulators) (Koren, 2010; Zimmerman, Shier, & Saliba, 2014). NHs implement culture change practices either through adopting established culture change models such as the Eden Alternative (Coleman et al., 2002), the Green House Project (Rabig, Thomas, Kane, Cutler, & McAlilly, 2006), and the Household Model (Action Act, 2020), or through developing their own tailored culture change initiatives.

Overview of Literature on Nursing Home Culture Change

A number of empirical studies examined the prevalence of and variations in culture change implementation, and the effects of various culture change practices on quality outcomes (Chisholm et al., 2018; Miller et al., 2014; Miller et al., 2018; Shier, Khodyakov, Cohen, Zimmerman, & Saliba, 2014; Wild & Kydd, 2016; Zimmerman & Cohen, 2014). Domain-specific assessment tools have been developed to facilitates a comprehensive measure of culture change practices (Sturdevant, Mueller, & Buckwalter, 2018). Several

nationwide surveys using domain-specific assessment tools have been conducted to examine the implementation of culture change practices in U.S. NHs. Overall, survey results indicated that NH involvement in culture change has increased substantially over the past two decades. A 2007 Commonwealth Fund national survey (n=1,435) found 43% of NHs reported little or no culture change implementation (considered traditional NHs) (Doty, Koren, & Sturla, 2008), while a 2009/2010 national survey (n=4,695) and a 2016/2017 national survey (n=2,142) respectively reported only 14% and 12% of NHs were considered traditional NHs (Miller, Looze, et al., 2014; Miller et al., 2018). In both the 2007 and the 2009/2010 survey, one-third of NHs reported culture change had completely changed some or all areas of the organization (considered culture change adopters) (Doty et al., 2008; Miller, Looze, et al., 2014). However, the proportion of culture change adopters increased to 45% in the 2016/2017 survey (Miller et al., 2018).

In general, culture change practices have been widely implemented, yet the depth and scope of culture change implementation vary across NHs. The variations are associated with the organization's budget, mission, leadership, workforce, resident case mix, or external policies (Chisholm et al., 2018; Grabowski, Elliot, Leitzell, Cohen, & Zimmerman, 2014; Miller et al., 2018; Zimmerman et al., 2014). The national surveys consistently indicated that NHs have been most successful at providing resident-centered care, while culture change practices in physical environment transformation and staff empowerment have gradually gained momentum (Doty et al., 2008; Miller, Looze, et al., 2014; Miller et al., 2018).

An increasing number of studies have examined the effects of culture change practices on a range of quality outcomes including clinical quality indicators (QIs) and

organization outcomes (Grabowski, O'Malley, et al., 2014; Miller & Bishop, 2018; Miller, Lepore, Lima, Shield, & Tyler, 2014; Sullivan et al., 2013; Sullivan, Shwartz, Stolzmann, Afable, & Burgess, 2017), and some examined the effects on resident quality of life (QOL) and satisfaction with care (Kane, Lum, Cutler, Degenholtz, & Yu, 2007; Poey et al., 2017). However, most existing studies generated little consistent evidence for the effects of NH culture change on quality outcomes, although some findings indicated potential benefits (Duan, Mueller, Yu, & Talley, 2020; Hill, Kolanowski, Milone-Nuzzo, & Yevchak, 2011; Shier, Khodyakov, Cohen, Zimmerman, & Saliba, 2014).

The gaps in the literature necessitate more research on the effect of NH culture change on quality outcomes. First, the evidence for the effects of culture change practices on resident QOL is still underdeveloped, even though NH culture change aims to improve QOL (Koren, 2010). Prior studies focused on clinical quality outcomes derived from clinical data or administrative data, and only a few examined QOL outcomes that capture multiple aspects of life including physical, psychological, social and environmental well-being (Duan et al., 2020; Hill et al., 2011; Shier et al., 2014). Family satisfaction has been rarely studied as an outcome of culture change implementation. Clinical quality outcomes are not as sensitive or relevant as QOL and satisfaction outcomes to culture change interventions; previous studies that exclusively focused on clinical QIs generated little consistent findings with respect to the effects of culture change practices (Duan et al., 2020; Hill et al., 2011; Shier et al., 2014).

Second, the literature is limited because previous research was scarcely conducted from a complex perspective that considered how various culture change practices work individually and together. NH culture change is inherently a complex intervention given

the number of interacting components, the number of groups or organizational levels targeted by the intervention, the number and variability of outcomes, and the degree of flexibility of the implementation (Craig et al., 2013; Sterns, Miller, & Allen, 2010; Styhre, 2002). An empirical approach that is based on systematic measures of culture change practices is lacking when examining culture change practices as a whole "package" to identify various levels and patterns of culture change implementation. Previous studies used heuristic approaches to identify the overall level of culture change implementation based solely on opinions of NH administrators or other external evaluators (Grabowski, Elliot, et al., 2014; Miller, Looze, et al., 2014; Miller et al., 2018). The heuristics approaches may fail to address the complexity of NH culture change with respect to the flexibility/non-standardization and multidimensional features of culture change implementation. As important as it is to examine culture change practices as a whole "package," it is also important to deconstruct the complex culture change construct into its domains and evaluated domain-sensitive outcomes, particularly when the outcomes such as resident QOL and family satisfaction are also multidimensional and complex by nature. Yet, few studies have attained such a nuanced investigation.

This study sought to fill these knowledge gaps by systematically examining the effects of culture change practices on resident QOL based on multidimensional measures of both culture change practices and resident QOL. Grounded in a complex perspective, this study examined culture change practices as a whole "package" and at the same time "unpacked" complex culture change to identify the salient components. In addition, this study considered the interactions between the domains of culture change practices. It also

examined family satisfaction and clinical QIs as secondary outcomes to understand a wider range of culture change effect.

Conceptual Framework

The theoretical underpinnings for this study were based on perspectives of complexity theory (Burnes, 2005; Lowell, 2016; Styhre, 2002), the Diffusion-of-Innovation theory (Rogers, 2010), and the Social Production Function theory (Gerritsen, Steverink, Ooms, & Ribbe, 2004; Steverink, Lindenberg, & Ormel, 1998). Complexity theory has been widely used in organizational and management research to study the non-linear, integrated, socially embedded and socially dependent process of organizational change (Burnes, 2005; Lowell, 2016; Styhre, 2002). This study integrated the concepts of complexity theory including multidimensionality, non-linearity, and connectivity into the examination of NH culture change (Burnes, 2005; Lowell, 2016; Styhre, 2002). Accordingly, this study viewed NH culture change as a complex intervention that involved a number of components targeting multiple groups and levels of an organization and contributed to a variety of outcomes. The multidimensional nature of NH culture change required a comprehensive and domain-specific measure of culture change practices, and an analysis of various factors that may be associated with culture change implementation (including NHs' structural and organizational characteristics) and quality outcomes resulting from culture change implementation (including resident QOL, family satisfaction, clinical QIs). The concepts of non-linearity and connectivity suggested that the effect of NH culture change was not attributed to simple linear pathways nor additive effects of individual components. Acknowledging this enabled an in-depth investigation that treated

NH culture change as interacting components and viewed the influence of culture change as a dynamic and complex process.

The Diffusion of Innovation theory, commonly used in public health and social sciences research, explains how an idea or practice gains momentum and diffuses into a specific population or social system (Haider & Kreps, 2004). This theory recently has been used to guide translation research on the diffusion of culture change practices in long-term care (Hermer et al., 2017; Miller et al., 2010). The Diffusion of Innovation theory posits that individuals and organizations do not adopt a new idea or practice at the same high rate, and therefore establishes five categories of adopters including innovator, early adopter, early majority, late majority, and laggards (Rogers, 2010). In the case of NH culture change, the adoption of various culture change initiatives may not happen simultaneously nor reach the same level within a NH or across NHs, which justify the existence of culture change typologies, namely the varying levels and patterns of culture change implementation. The different levels of adoption are facilitated or hindered by unique characteristics of NHs and lead to different outcomes. Guided by the Diffusion of Innovation theory, this study attempted a comprehensive examination of the distinct levels and patterns of culture change implementation within a NH or across NHs, and NH characteristics and quality outcomes associated with the types of culture change implementation.

The Social Production Function theory was used to understand resident QOL and its association with culture change practices (Gerritsen, Steverink, Ooms, & Ribbe, 2004; Ormel, Lindenberg, Steverink, & Verbrugge, 1999; Ormel, Lindenberg, Steverink, & Vonkorff, 1997; Steverink, Lindenberg, & Ormel, 1998). Integrating theories from psychology and economics, the Social Production Function theory proposes a

multidimensional and hierarchical structure of QOL. Like people of other ages in general, older adults living in NHs maintain QOL through realizing two universal goals—physical well-being and psychosocial well-being which are achieved by realizing lower-level instrumental goals. Physical well-being is attained by fulfilling two instrumental goals including comfort and stimulation. Comfort refers to the fulfillment of essential physical needs (e.g. food, rest, warmth), and the absence of health complaints (e.g., pain, fatigue). Stimulation refers to the pleasant range of activation (physically and mentally) and the absence of boredom. Psychosocial well-being is attained by fulfilling three instrumental goals including status, behavioral confirmation, and affection, which refer to whether a person is respected, accepted, and loved by self or others respectively.

The Social Production Function theory provides a theoretic basis for understanding the effects of culture change practices on QOL. The theory assumes that a person strives to achieve instrumental goals and ultimately attain optimal QOL through optimizing physical and psychosocial resources he/she possesses, and a deficiency of one type of resources will be substituted with other types of resources (Ormel et al., 1999; Ormel et al., 1997). Older adults residing in NHs are faced with considerable changes in physical and psychosocial resources such as the decline in physical and cognitive function, a transition to a new living environment, interruption of previous social networks, and changes in daily life routines. Culture change practices that are committed to providing a homelike environment, normalizing resident daily life routines, honoring resident preferences, and nurturing caring relationships will mitigate residents' loss of physical and psychosocial resources they used to possess to maintain optimal QOL. The Social Production Function theory supported the use of a comprehensive and domain-specific measure of resident QOL

in this study, and it also facilitated the formulation of the study hypothesis that NH culture change practice are positively associated with resident QOL.

Study Aims

The long-term goal of this study is to understand how NH culture change practices affect resident QOL. The aims of this study are as follows: (1) describe the implementation of culture change practices in NHs in Minnesota; (2) generate an empirical typology of culture change implementation; (3) examine NH structural and organizational characteristics that are associated with the types of culture change implementation; (4) examine variations in quality outcomes across the types of culture change implementation. The primary outcome is resident QOL, and the secondary outcomes include family satisfaction and clinical quality indicators (QIs); (5) test the domain-specific relationships of culture change practices with resident QOL and family satisfaction; and (6) examine the moderating effect of small homes or households on these relationships.

This study aims to answer the following research questions: (1) how are culture change practices implemented in NHs in Minnesota? (2) what are the distinct levels and patterns of culture change implementation (types of culture change implementation) across NHs? (3) what is the association between NH structural and organizational characteristics and different types of culture change implementation? (4) What is the variation of quality outcomes across the types of culture change implementation? (5) what is the association between individual domains of culture change practices and individual domains of resident QOL or family satisfaction? (6) what is the role of small homes or households in moderating the relationships of culture change practices with resident QOL and family satisfaction?

Research Plan

A critical literature review and a quantitative study were conducted to achieve the study aims. This section outlines the research plan and describe the presentation of the study aims and findings in the chapters. First, a critical review of literature was conducted to examine and synthesize the current evidence for the effects of culture change practices on QOL for residents in U.S. NHs, as presented in Chapter 2 (Manuscript 1). The literature review informed the identification of gaps in knowledge and the formulation of research questions for the quantitative study.

Chapter 3 details research methods with regard to study design, variables and measures, procedures of data collection, and the statistical analysis for the quantitative study. This study applied a cross-sectional design, and the sample included all Medicare and/or Medicaid certified NHs (n=363) in Minnesota. This study involved both primary data collection and the use of secondary data. The primary data were collected through a survey of NH administrators about culture change practices. This study surveyed NH administrators in each NH using a comprehensive culture change assessment tool that measures six domain of culture change practices including physical environment, resident-centered care, staff empowerment, staff leadership, family and community engagement, and end-of-life care (Miller et al., 2018). The secondary data were obtained from existing administrative databases provided by the Minnesota Department of Human Services. The secondary administrative data contained variables of NH structural and organizational characteristics, and facility-level risk-adjusted quality measures including resident QOL, family satisfaction, and clinical QIs. This study focuses on NHs in Minnesota because the

state of Minnesota possesses a unique database of resident QOL and family satisfaction, which is not available in other states.

Chapter 4 presents study results for Aim 1 that described the implementation of culture change practices in NHs in Minnesota. Sample weight adjustment was applied to descriptive statistics to ensure that the results can be generalized to all NHs in Minnesota. Both unweighted and weighted descriptive statistics were used to describe sample characteristics and culture change survey results.

Chapter 5 presents a published manuscript (Manuscript 2) entitled "An empirical typology of nursing home culture change implementation" that discusses research methods and findings for Aims 2, 3, and 4. This manuscript presents results of a latent profile analysis used to generate a typology of culture change implementation (Aim 2). Analysis of variance (ANOVA) and Chi-square tests were applied to examine variations in culture change scores and NH characteristics across the types of culture change implementation (Aim 3). A set of regression models were fitted to examine variations in quality outcomes including resident QOL, family satisfaction, and clinical QIs across the types of culture change implementation (Aim 4).

Chapter 6 presents another (unpublished) manuscript (Manuscript 3) entitled "The relationships of nursing home culture change practices with resident quality of life and family satisfaction: towards a more nuanced understanding." This manuscript focus on Aims 5 and 6. First, a set of linear regression models were built separately for the summary scores of resident QOL and family satisfaction, and their domain scores to test the domain-specific relationships of culture change practices with resident QOL and family satisfaction

(Aim 5). A test of moderating effect of small homes or households was performed for each individual culture change domain (Aim 6).

Chapter 7 is the synthesis of overall findings of study. Implications of results for NH providers, policymakers and advocates are discussed. This chapter also identifies the limitations of the study and directions for future research.

Significance and Innovations

The findings of this study provide significant implications for practice, policymaking, and research on NH culture change. First, the empirical typology of culture change implementation provides insight into how various culture change practices were implemented and how the implementation varied across NHs. NH providers will benefit from these findings as they implement and advance culture change in their facility. The findings can also inform policy decisions towards resource allocation to promote culture change extensively within a NH and across NHs. The empirical typology approach provides researchers with a new lens to study dynamic and complex culture change. Second, through an in-depth examination of domain-specific relationships between culture change practices and quality outcomes, this study informs the design of outcome-oriented culture change initiatives tailored to address the needs of residents that are pressing. Testing the moderating effect of small homes and households sheds light on the interaction between physical environment renovations and culture change initiatives in care and workplace practices and provides more specific implications for culture change implementation in NHs maintaining the traditional architectural structure and NHs implementing small homes or households model. The overall findings with regard to the relationships of NH culture change with resident QOL and other quality outcomes will supplement the evidence base

for the effects of culture change practices, which is imperative for the future development of evidence-based culture change interventions.

This study is innovative in the following respects: (1) it systematically measures multiple domains of culture change practices; (2) it generates an empirical typology of culture change implementation based on a latent profile analysis; (3) it targets multiple domains of QOL measures to examine the whole range of effects of culture change practices on resident QOL; (4) it examines how multiple domains of culture change practices work individually and collectively in affecting resident QOL and family satisfaction; (5) it explores the roles of small homes and households in moderating the effects culture change practices on quality outcomes.

Chapter 2 The Effects of Nursing Home Culture Change on Resident Quality of Life in U.S. Nursing Homes: An Integrative Review (Manuscript 1)

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Overview

Culture change is intended to transform nursing homes from impersonal institutions into person-centered homes. Despite a growing interest in studying culture change, empirical evidence for its effects on quality of life (QOL) has not been synthesized. This integrative review examined how QOL outcomes were measured in culture change studies, and analyzed the current evidence for culture change effects on QOL. Guided by a conceptual framework, this review systematically searched for literature in multiple databases, and identified 11 eligible studies. QOL measures varied across studies, ranging from overall perception of life to specific measures associated with physical and psychosocial well-being. Overall, culture change demonstrated a positive trend in benefiting QOL. While inconsistent evidence existed for most QOL measures, relatively consistent evidence was found to support positive effects on resident satisfaction and autonomy. Rigorous designs are needed for future studies to generate strong evidence.

Introduction

Culture change in long-term care is committed to transforming traditional nursing homes from impersonal health care institutions into genuine person-centered homes where residents' choice, dignity, respect, self-determination and purposeful living are valued, and staff' voices are solicited and respected (The Pioneer Network, 2018). In the U.S., culture change began as a grassroots movement in nursing homes in the 1990s, and it has become a nationwide and global campaign to promote person-centered values and practices across all long-term care areas (Koren, 2010). A number of culture change models have been widely implemented in U.S. nursing homes, including the Eden Alternative, the Green House Project, Wellspring, and the Household Model (Shier, Khodyakov, Cohen, Zimmerman, & Saliba, 2014; Hill, Kolanowski, Milone-Nuzzo & Yevchak, 2011). Although culture change practices are implemented differently, the commonly acknowledged principles embrace resident-directed care, homelike atmosphere, close relationships, staff empowerment, collaborative decision making, and quality improvement processes (Koren, 2010).

The ultimate goal of culture change is to improve resident quality of life (QOL) (Koren, 2010; Rahman & Schnelle, 2008). QOL is an individual's multidimensional appraisal of important aspects of life (Kane, 2003; Ormel, Lindenberg, Steverink & Verbrugge, 1999), and is an essential quality measure for nursing home care (Castle, & Ferguson, 2010). A body of literature studying the effects of culture change practices on a variety of outcomes has been growing, and some literature reviews have synthesized empirical findings about culture change effects (Shier et al., 2014; Hill et al., 2011). These reviews mainly focused on quality of care measures such as clinical outcomes (e.g.,

morbidity, mortality, adverse medical events) and organizational outcomes (e.g., hospitalization, medical cost) (Shier et al., 2014; Hill et al., 2011). No synthesis of the literature has specifically focused on QOL as an outcome of culture change practices. One of the challenges in synthesizing the evidence for QOL is the variation in definitions and measures of QOL. Despite this challenge, QOL is an important primary outcome. Unlike quality of care measures which only have clinical focus and are from staff reports or other administrative records, QOL conceptually corresponds to the principles of culture change as it captures an individual's physical and psychosocial well-being and is directly derived from residents' voices through a survey or an interview (Castle, & Ferguson, 2010).

Although culture change has strong face validity in improving QOL intuitively (Koren, 2010), a synthesis of literature is warranted to inform evidence-based policy and practice for promoting culture change practices. This integrative review aimed to (1) examine how QOL was measured in studies examining the effects of culture change practices; and (2) analyze the current evidence on the effects of culture change practices on QOL for residents in U.S. nursing homes.

Methods

Conceptual Framework

Given that both culture change practices and QOL are multidimensional constructs and are not consistently defined, a conceptual framework was developed to specify the operational definitions of the two constructs, and to guide the selection and synthesis of studies (see Figure 2-1). The conceptual framework is based on the Nursing Home Integrated Model for Producing and Assessing Cultural Transformation (the Nursing Home

Integrated Model) (Hartmann et al., 2013) and the Social Production Function theory (Ormel et al., 1999; Ormel, Lindenberg, Steverink, & Vonkorff, 1997). The Nursing Home Integrated Model categorizes culture change practices into three domains including care practices, workplace practices, and the environment of care (Hartmann et al., 2013). Culture change in care practices involves prioritizing resident preferences and autonomy regarding daily living, privacy, and comfort, providing meaningful activities, and promoting resident engagement and resident-centered clinical care where clinical protocols are individualized and shared decision-making is promoted. Culture change in workplace practices involves decentralization of authority and staff empowerment (e.g., granting direct care staff decision making authority regarding routines and care delivery), consistent staff assignment, interdisciplinary collaboration, and effective, respectful and nonhierarchical communication among leadership, management, staff and residents. Culture change in environment involves modifying the physical environment to create homelike atmosphere, to promote independence and privacy, and to foster spontaneity and engagement.

The Social Production Function theory provides a heuristic framework for understanding QOL (Steverink, Lindenberg & Ormel, 1998; Gerritsen, Steverink, Ooms & Ribbe, 2004). Integrating theories from psychology and economics, the Social Production Function theory proposes a multidimensional and hierarchical structure of QOL (Ormel et al., 1999; Ormel et al., 1997). Like people of other ages in general, older adults living in nursing homes maintain QOL through realizing two universal goals—physical well-being and psychosocial well-being which are achieved by realizing lower-level instrumental goals. Physical well-being is attained by fulfilling two instrumental goals including

comfort and stimulation. Comfort refers to the satisfaction of basic physical needs (e.g. food, rest, warmth), the absence of pain, fatigue and other health complaints. Stimulation refers to the pleasant range of activation (physically and mentally) and the absence of boredom. Psychosocial well-being is attained by fulfilling three instrumental goals including status, behavioral confirmation, and affection which refer to whether a person is respected, accepted, and loved by self or others respectively. Accordingly, QOL can be measured at three levels: overall perception of life, two universal goals (physical and psychosocial well-being), and five instrument goals (comfort, stimulation, status, behavioral confirmation, and affection).

The Social Production Function theory provides a theoretic basis for the potential effects of culture change practices on QOL. The theory assumes that a person strives to achieve instrumental goals for attaining optimal QOL through optimizing physical and psychosocial resources he/she possesses, and a deficiency of one type of resources will be substituted with other types of resources (Ormel et al., 1999; Ormel et al., 1997). Older adults residing in nursing homes are faced with considerable changes in physical and psychosocial resources such as the decline in physical and cognitive function, a transition to a new living environment, interruption of previous social network, and changes in daily life routines. Culture change practices which are committed to providing a homelike environment, normalizing resident daily life routines, focusing on resident needs, and nurturing caring relationships will function to mitigate residents' loss of physical and psychosocial resources they used to possess.

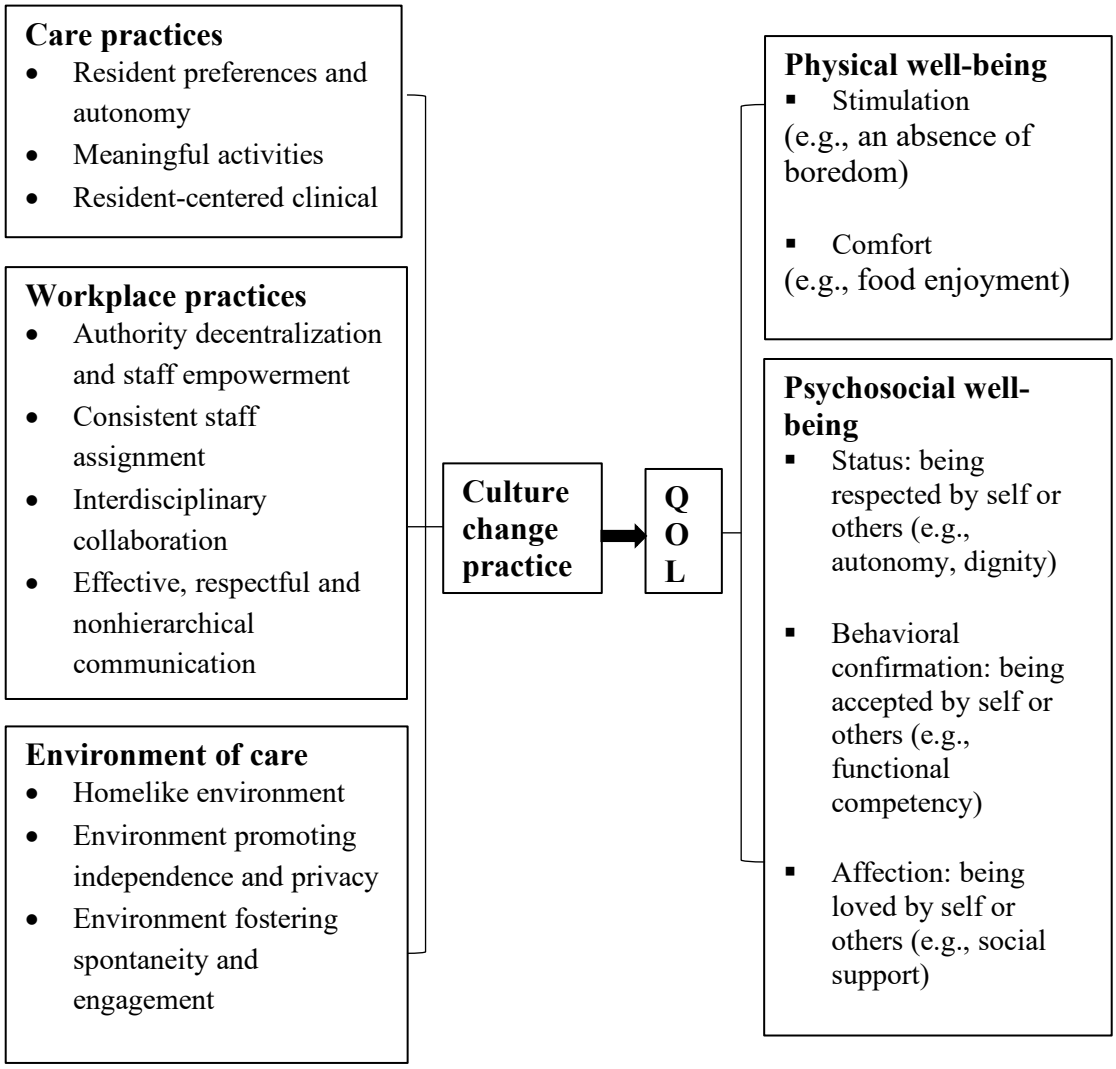

Figure 2-1 Framework for Evaluating the Relationship between Nursing Home Culture Change and Residents' Quality of Life

Literature Search

This review included peer-reviewed and gray literature published in English from January 1997 to June 2019. Four databases including Ovid MEDLINE, Cumulative Index to Nursing and Allied Health (CINAHL), PsycInfo, and the Web of Science, were searched using keywords individually and in combination: *culture change, resident-centered care, person-centered care, the Eden Alternative, the Green House, the Pioneer Network,*

Wellspring, the household model, or *staff empowerment*. The search was limited to *nursing homes, skilled nursing facilities, residential facilities,* or *homes for the aged*. Gray literature was searched in the Web of Science Conference Proceedings Citation Index, ProQuest Dissertations & Theses, and the New York Academy of Medicine. In addition, reference lists of selected articles were reviewed to identify additional relevant articles.

Study Selection

Titles and abstracts were screened to select articles that examined the effects of culture change practices on QOL. Culture change practices are operationalized as any domain or subdomain classified by the Nursing Home Integrated Model (Hartmann et al., 2013). QOL is measured by self-reported instruments and at any of the three levels congruent with the Social Production Function theory (Ormel et al., 1997). Additionally, further inclusion criteria were as follows: 1) conducted in U.S. nursing homes that provide on-site 24-hour skilled nursing care; 2) using quantitative research designs with a concurrent comparison group or self-comparison. Only studies conducted in nursing homes in the U.S. were selected for this review to eliminate the influence of health system variations across countries. Following the initial screening of the titles and abstracts, full texts of selected articles were reviewed to determine their eligibility for the final inclusion.

Data Extraction and Synthesis

The first author extracted the following information from eligible studies, including study design, setting, participants, culture change practices, QOL measures, and results. Given the heterogeneity of the studies' theoretical underpinnings, designs, and outcome measures, a narrative analysis was conducted and was organized according to the categories of QOL measures.

Assessment of Study Quality

The first author evaluated the quality of each study using the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project (1998). The second author reviewed the results in an iterative manner until the consensus was reached. The Quality Assessment Tool for Quantitative Studies has well-established validity for both randomized and non-randomized studies, and is particularly appropriate for evaluating population-based intervention studies or public health programs (Thomas, Ciliska, Dobbins & Micucci, 2004; Thomas et al., 2004). The tool assesses domains of selection bias, study design, confounders, blinding, data collection, and withdrawals. Each domain was rated *strong, moderate, or weak*, and a global rating of the overall quality was determined based on ratings of each domain. Studies having no weak rating, one weak rating/unreported domain, or two or more weak ratings/unreported domains were rated strong, moderate, and weak respectively in the global rating.

Results

Out of 869 publications identified, 11 studies (6 peer-reviewed articles, 4 dissertations, and 1 report from the Commonwealth Fund) were eligible to be included for the qualitative synthesis. The flow diagram in Figure 2-2 illustrates the search process as suggested by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Group (Moher, Liberati, Tetzlaff & Altman, 2009). As demonstrated in Table 2-1, the studies used four types of research designs including a quasi-experimental design with comparison groups and repeated outcome measures (n=6), a single group pre-posttest (n=2), a longitudinal retrospective cohort design (n=1), and a cross-sectional design (n=2).

Studies involving repeated outcome measures had different follow-up durations ranging from 6 months to 5 years. The sample sizes ranged from 25 residents in a single nursing home to thousands of residents in a national sample of nursing homes. All studies conducted face-to-face interviews of residents to collect QOL data.

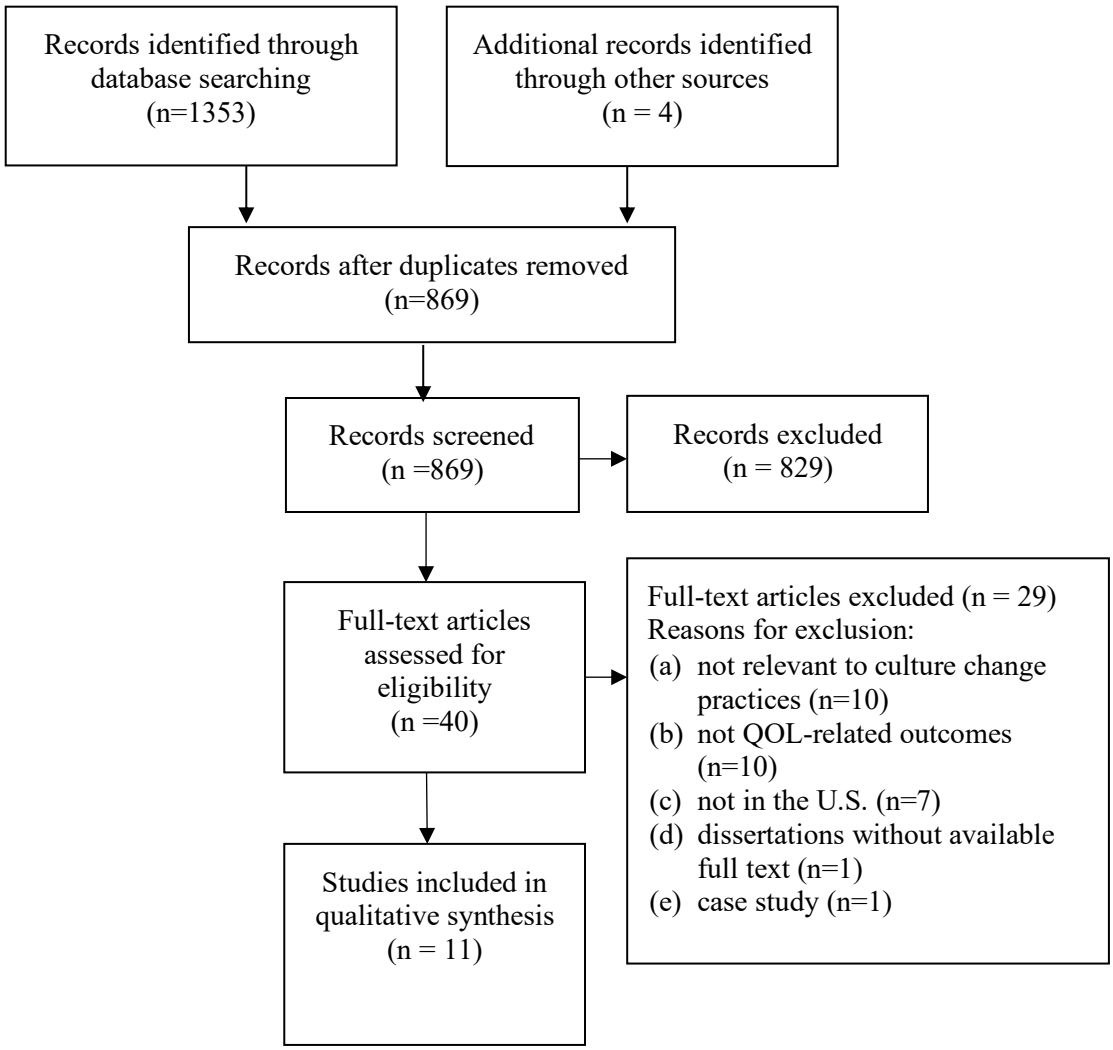

Figure 2-2 PRISMA Flow Diagram of Literature Search

Table 2-1 Basic Characteristics of 11 Eligible Studies

The First Author (year)	Study design (follow-up duration)	Settings	Participants (characteristics)	Culture change model	QOL measures	Results [a]
Quasi-experimental design						
Bergman-Evans (2004)	Quasi-experimental with a control group (1 year)	A veterans' home as an implementing NH and a non-profit NH as a control NH	64 residents (55.9% female, 91.2% white, 51-105 years old)	The Eden Alternative Model	Loneliness Helplessness Boredom	Implementing NH had lower boredom ($p = .01$), less helplessness ($p = .03$) compared to control NH at 1-year follow-up.
Parson (2004) [b]	Quasi-experimental with a control group (9 months)	2 implementing NHs and 1 control NH from one provider	60 residents (73.3% female, 88.3% white, 77.5 years old and 41.2 months LOS on average)	The Eden Alternative Model	5 domains of QOL (self-esteem, positive affect, negative affect, feelings of belongs, sense of aesthetics) Overall QOL (a single question) Depression Loneliness Social networks	Depression and loneliness were significantly lower in implementing NHs compared to control NH at 9-month follow-up ($p<.05$).

Table 2-1 Basic Characteristics of 11 Eligible Studies (continued)

Author (year)	Study design (follow-up duration)	Setting	Participants (characteristics)	Culture change model	QOL measures	Results [a]
Kane et al. (2007) [c]	Quasi-experimental with a control group (6, 12 and 18 months)	4 implementing NHs and 2 control NHs from one provider	120 residents (80.8% female, 88.3% white, 85.7 years old and 32.7 months LOS on average, MDS cognitive performance score[d] is 3.2 on average)	The Green House Model	Overall satisfaction Emotional well-being Self-reported health ADL and IADL 11 domains of QOL (function, security, privacy, meaningful activity, comfort, relationships, food enjoyment, dignity, individuality, autonomy, and spiritual well-being)	Green House had better outcomes than control NHs overall in follow-ups ($p<.05$): 9 QOL domains (privacy, dignity, meaningful activity, relationship, autonomy, food enjoyment, security, spiritual well-being, individuality) Emotional well-being Overall satisfaction.
Grant [b, c] (2008)	Quasi-experimental with a control group (6 and 12 months)	7 for implementation NHs,10 matched control NHs from a for-profit chain	950 residents (not reported)	An internally-developed culture change model	Autonomy Dignity	Implementing NHs had better autonomy compared to control NHs at 6-month follow-up ($p=.056$) and at 12-month follow-up ($p<.01$).
Molony et al. (2011) [c]	Quasi-experimental with control group (1, 3 and 6 months)	1 implementing NH and 1 control NH from one provider	25 residents (84% female, 84 years old and MMSE 22.9 on average)	Small-House Model	Social support Self-rated health At-homeness ADL	Significant time by implementation interactions for at-homeness and ADL ($p<.01$) (at-homeness and ADL maintained in control NH, while improved in implementing NH).

Table 2-1 Basic Characteristics of 11 Eligible Studies (continued)

Author (year)	Study design (follow-up duration)	Setting	Participants (characteristics)	Culture change model	QOL measures	Results [a]
Burack et al. (2012) [c]	Quasi-experimental with a control group (2, 5 years)	13 communities across 3 NHs from one provider (7 for implementation and 6 matched for control)	63-75 residents (56.5% female, 61% white, 63-102 years old, 3-120 months LOS, 95% moderate cognitive impairment or less)	An internally-developed culture change model	Perceptions of choice over basic everyday activities	Overall choice increased from baseline to 2-year follow-up in implementing NH ($p<.01$), but decreased at the 5-year follow-up ($p<.01$).
Ruchdeschel et al. (2001)	Single group pre-posttest (6-month)	1 NH	26 residents (77% female, 87 years old and MMSE=22.8 on average)	The Eden Alternative Model with only the introduction of animals	Overall satisfaction Overall QOL Boredom Helplessness Loneliness	No significant improvements in any outcome overtime ($p>.05$).
Jones (2010) [b]	Single group pre-posttest (3 months)	2 units in a NH	29 residents (82.8% female, 63-96 years old, MMSE>25)	In-services person-centered care education for CNAs	11 domains of QOL (function, security, privacy, meaningful activity, comfort, relationships, food, enjoyment, dignity, individuality, autonomy, and spiritual wellbeing)	Dignity ($p=.04$) and security ($p=.02$) were significantly improved at 3-month follow-up.

Table 2-1 Basic Characteristics of 11 Eligible Studies (continued)

Author (year)	Study design (follow-up duration)	Setting	Participants (characteristics)	Culture change model	QOL measures	Results [a]
Observational design						
Aguilar (2011) [b]	Cross-sectional	24 implementing NHs and 25 control NHs	368 residents (not reported)	Not-unified culture change models (dichotomous measure—culture change adopters vs non-adopters)	Overall satisfaction Satisfaction with life Satisfaction with clinical care Satisfaction with social services Physical environment comfort	No significant difference in any outcome between implementing NHs and control NHs (p>.05).
Murray (2010) [b]	Cross-sectional	2 NHs from one provider	13 residents (53.8% white, 76.9% female, 65-97 years old, 10-120 months LOS)	Not-unified culture change models (measured with the Artifacts of Culture Change instrument)	11 domains of QOL (function, security, privacy, meaningful activity, comfort, relationships, enjoyment, dignity, individuality, autonomy, and spiritual wellbeing) Choice and control Overall satisfaction	The NH having higher culture change score had better privacy and security (p<.05).
Poey et al. (2017) [c]	Longitudinal retrospective cohort study (1 year)	320 NHs in Kansas	5538-6214 (not reported because the unit of data analysis was at facility)	Not-unified culture change models (measured with a culture change staging tool)	Overall satisfaction Satisfaction with life Satisfaction with clinical care Satisfaction with social services	Overall satisfaction, overall QOL, satisfaction with clinical care were higher in NHs that had fully implemented culture change practices (stage 4) compared to non-adopters (p<.05). NHs at stage 1-3 had no significant improvement in the outcomes.

Note. a: only outcomes with statistical significance were reported. b: gray literature; c: moderate-quality study; d: MDS cognitive performance score has a range of 0-6 with higher scores reflecting more-severe impairment; NH: nursing home; QOL: quality of life; ADL: activities of daily life; IADL: instrumental activities of daily life; CNA: certified nursing assistants; LOS: length of stay; MMSE: Mini Mental State Exam; MDS: Minimum Data Set.

Study Quality Appraisal

Figure 2-3 summarizes the quality appraisal of each study. The global rating of methodological quality was moderate for 5 studies (45.5%) and weak for 6 studies (54.5%). Moderate and weak ratings were due to selection bias, a non-randomized study design, inadequate control of confounders and/or withdrawals, and a lack of blinding. Three studies were rated weak in the domain of s*election bias*, given a consent rate lower than 60%. In the domain of *study design*, 7 studies applying a quasi-experimental design with comparison groups or a retrospective cohort design were rated moderate, while 4 studies using a cross-sectional design and a single group pre-posttest design were rated weak. As two groups of confounders were expected to bias the test of culture change effects on QOL including structural and organizational characteristics of nursing homes, and sociodemographic and health-related characteristics of residents (Shippee, Henning-Smith, Kane & Lewis, 2015; Xu, Kane & Shamliyan, 2013), studies addressing none, either, or both types of confounders were rated weak (n=5), moderate (n=4), and strong (n=2) respectively in the domain of *confounders*. Studies having withdrawals less than 20% were considered strong in the domain of *withdrawals* (n=3). Studies (n=2) were rated moderate if they had more than 20% withdrawals yet had conducted sensitivity analysis to eliminate the influence of missing data. All quasi-experimental studies (n=8) were rated weak in the domain of *blinding* due to a disclosure of group assignment to participants. Nine studies using validated outcome measure instruments were rated strong in the domain of *data collection*.

	Selection bias	Study design	Confounders	Blinding	Data collection method	Withdrawals and dropouts	Global rating
Bergman-Evans (2004)	nr[a]	±	-	-	±	-	Weak
Parson (2004)	-	±	±	-	+	-	Weak
Kane et al. (2007)	+	±	+	-	+	±	Moderate
Grant (2008)	±	±	±	-	+	nr[b]	Moderate
Molony et al. (2011)	±	±	±	-	+	+	Moderate
Burack et al. (2012)	±	±	±	-	+	nr[b]	Moderate
Ruchdeschel et al. (2001)	+	-	-	-	+	+	Weak
Jones (2010)	+	-	-	-	±	+	Weak
Aguilar (2011)	-	-	-	na[a]	+	na[b]	Weak
Murray (2010)	-	-	-	na[a]	+	na[b]	Weak
Poey et al. (2017)	nr[a]	±	+	na[a]	+	±	Moderate

Note. + strong; ± moderate; - weak;
nr[a]: consent rate was not reported; nr[b]: withdrawal rate was not reported; na[a]: not applicable given a non-experimental design; na[b]: not applicable given a cross-sectional design.

Figure 2-3 Quality Evaluation of 11 Eligible Studies using the Quality Assessment Tool for Quantitative Studies

The Implementation of Culture Change Practices

Among the quasi-experimental studies, culture change practices were implemented either through adopting an internally-developed model (Grant, 2008; Burack, Reinhardt & Weiner, 2012; Jones, 2010) or a well-defined culture change model such as the Green House Model (Kane, Lum, Cutler, Degenholtz & Yu, 2007), the Eden Alternative (Bergman-Evans, 2004; Parson, 2004; Ruchdeschel & Haitsma, 2001) and the Small House Model (Molony, Evans, Jeon, Rabig & Straka, 2011). All three observational studies did

not involve a specific culture change model and instead measured culture change practices using a dichotomous measure (i.e., culture-change adopters vs non-adopters) (Aguilar, 2011), a staging tool (i.e., no implementation, partial implementation, full implementation) (Poey et al., 2017;), and a comprehensive assessment tool (i.e., the Artifacts of Culture Change Instrument) (Murray, 2010).

Table 2-2 presents culture change domains and subdomains addressed by eight quasi-experimental studies based on the Nursing Home Integrated Model (Hartmann et al., 2013). It was difficult to specify culture change practices for the remaining three observational studies due to a lack of information regarding culture change implementation. Six quasi-experimental studies addressed more than one culture change domain, and five of them addressed all three culture change domains (Bergman-Evans, 2004; Parson, 2004; Grant, 2008; Kane et al., 2007; Burack, et al., 2012). Two studies only addressed one domain of culture change. For example, Ruchdeschel et al. (2001) only adopted one principle of the Eden Alternative model that is associated with including pets, plants, and children as the axis of daily life; in Jones's study (2010), the intervention only involved fulfilling residents' preferences and promoting autonomy.

Five studies involving the domain of workplace practices addressed three essential subdomains including interdisciplinary collaboration, authority decentralization and staff empowerment, and effective, respectful and nonhierarchical communication, and two of them addressed consistent staff assignment besides the three subdomains (Bergman-Evans, 2004; Parson, 2004; Grant, 2008; Kane et al., 2007; Burack, et al., 2012). Honoring resident preferences and autonomy, and providing meaningful activities were two subdomains that are addressed the most frequently in care practices (addressed by seven studies), while

resident-centered clinical care (e.g., residents/family involving in care planning) was only mentioned in two studies (Grant, 2008; Burack, et al., 2012). While most studies focused on creating a homelike environment (e.g., homelike and personalized decorations), some studies implemented more thorough transformation such as using a household model to promote independence and privacy, or introducing plants, animals, and child day care to foster spontaneity and engagement.

Table 2-2 Domains and Subdomains of Culture Change Practices in 8 Quasi-Experimental Studies

Domains of Culture Change Practices	Subdomains of Culture Change Practices	Culture Change Model & Study							
		The Eden Alternative			The Green House	The Small House	Internally-developed model		
		Bergman-Evans (2004)	Parson (2004)	Ruchde-schel et al. (2001)	Kane et al. (2007)	Molony et al. (2011)	Grant (2008)	Jones (2010)	Burack et al. (2012)
Work-place practices	Interdisciplinary collaboration	X	X		X		X		X
	Authority decentralization and staff empowerment	X	X		X		X		X
	Effective, respectful and nonhierarchical communication	X	X		X		X		X
	Consistent staff assignment				X		X		X
Care practices	Preferences and autonomy	X	X		X	X	X	X	X
	Meaningful activities	X	X		X	X	X	X	X
	Resident-centered clinical care (e.g., residents/family involving in care planning)						X		X
Environ-ment	Homelike environment	X	X		X	X	X		X
	Environment fostering spontaneity and engagement (e.g., introducing plants, animals, and children)	X	X	X					
	Environment promoting independency and privacy (e.g., small-house, household model)				X	X	X		
	No. of subdomains (n=10)	7	7	1	8	4	9	2	8

Measures of QOL

Studies measured QOL differently and they used more than one QOL measure. Table 2-3 summarized QOL measures that correspond to QOL domains defined by the Social Production Function theory. Studies addressing overall perception of life measured satisfaction with life or care, and emotional well-being. Regarding two instrumental goals for achieving physical well-being, *stimulation* was measured with boredom, and *comfort* was measured with physical environment comfort, food enjoyment, and security. Psychosocial well-being consisting of *status*, *behavioral confirmation*, and *affection* was measured with diverse indicators. Studies measuring *status* used indicators such as helplessness, choice/autonomy, dignity/self-esteem, privacy, and individuality/personal identity. *Behavioral confirmation* was measured with indicators such as functional status, self-rated health, meaningful activities, and spiritual well-being. *Affection* was measured with social support, loneliness, relationship, and feeling of belonging.

A diversity of instruments was used to measure QOL and they varied in comprehensiveness and psychometric properties. The most comprehensive QOL instrument was *the Quality of Life Scale for Nursing Home Residents* developed by Kane (2003) which was used in three studies (Kane et al., 2007; Murray, 2010; Jones, 2010). Two other multi-domain QOL intruments—*the Quality of Life in Dementia Scale* was used in one study (Ruckdeschel et al., 2001) and *the Dementia Quality of Life Tool* was used in another study (Parsons, 2004). Other instruments were also applied to measure discrete QOL-related constructs, including *the Duncan Choice Index* (Burack et al., 2012), *the Geriatric Depression Scale* (Molony et al., 2011; Parsons, 2004), *the Experience of Home Scale* (Molony et al., 2011), *the UCLA Loneliness Scale* (Bergman-Evans, 2004;

Ruckdeschel et al., 2001; Parsons, 2004), *Norbeck Social Support Questionnaire* (Molony et al., 2011), *the Lubben Social Network Scale* (Parsons, 2004), and *the Pearlin and Schooler's Mastery Scale* (Ruckdeschel et al., 2001). Two studies used a single item to measure boredom or helplessness (Bergman-Evans, 2004; Ruckdeschel et al., 2001).

Effects of Culture Change Practices on QOL

Table 2-3 summarizes the study findings regarding the effects of culture change practices on QOL. The table illustrates the number of studies examining the relationship between culture change practices and each QOL measure for all studies (n=11) and for those that were rated as moderate quality (n=5). The table also illustrates the number of studies where the relationship between culture change practices and the QOL measure was statistically significant. Overall, there was a positive trend indicating culture change practices in nursing homes have a positive effect on resident QOL. Non-significant findings were most often from studies rated weak in quality or studies with a small sample size (e.g., the number of participants<30). For the five moderate quality studies, the QOL measures including satisfaction with care and satisfaction with life associated with the domain of overall perception of life (Kane et al., 2007; Poey et al., 2017), and autonomy associated with the domain of psychosocial well-being (Kane et al., 2007; Burack et al., 2012; Grant, 2008) demonstrated the strongest evidence for the effects of culture change practices on QOL

Table 2-3 Summary of QOL Measures and the Effects of Culture Change Practices on QOL by Domains/Subdomains of QOL Measures for 11 Eligible Studies

QOL domains based on Social Production Function theory	QOL measures in reviewed studies	For all studies (n=11)		For studies with moderate quality (n=5)	
		No. of studies measuring the outcome	No. of studies with statistically significant findings supporting the effects of CC on the outcome	No. of studies measuring the outcome	No. of studies with statistically significant findings supporting the effects of CC on the outcome
OVERALL PERCEPTION OF LIFE	Satisfaction with care	5	2	2	2
	Satisfaction with life	5	2	2	2
	Emotional status	3	2	1	1
PHYSICAL WELL-BEING					
Stimulation	Boredom	2	1	0	0
Comfort	Physical environment comfort	4	0	1	0
	Food enjoyment	3	1	1	1
	Security	3	3	1	1
PSYCHOSOCIAL WELL-BEING					
Status (being respected by self or others**)**	Helplessness	2	1	0	0
	Choice/Autonomy	5	3	3	3
	Dignity/self-esteem	5	2	2	1
	Privacy	3	2	1	1
	Individuality/personal identity	3	1	1	1

Table 2-3 Summary of QOL Measures and the Effects of Culture Change Practices on QOL by Domains/Subdomains of QOL Measures for 11 Eligible Studies (Continued)

QOL domains based on Social Production Function theory	QOL measures in reviewed studies	For all studies (n=11)		For studies with moderate quality (n=5)	
		No. of studies measuring the outcome	No. of studies with statistically significant findings supporting the effects of CC on the outcome	No. of studies measuring the outcome	No. of studies with statistically significant findings supporting the effects of CC on the outcome
Behavioral confirmation (being accepted by self or others**)**	Functional competence	4	1	2	1
	Self-rated health	2	0	2	0
	Meaningful activities	4	1	1	1
	Spiritual well-being	3	1	1	1
Affection (being loved by others or self**)**	Social support	2	0	1	0
	Loneliness	3	1	0	0
	Relationship	3	1	1	1
	Feeling of belonging	1	0	0	0

Notes: QOL=quality of life; CC=culture change

Discussions

Guided by the conceptual framework, 11 studies were included in this review. QOL measures varied across the studies, ranging from overall measures to domain-specific measures. This review categorized QOL measures into overall perception of life, and specific instrumental goals for achieving physical and psychosocial well-being. Culture change practices varied in scope and content among reviewed studies. Overall, the effects of culture change practices on all QOL measures had a positive trend. While inconsistent evidence existed for most QOL measures, relatively consistent evidence was found to support positive effects on satisfaction with care, satisfaction with life, and autonomy.

It was difficult to compare the effects of different culture change models and to link the effective components of culture change to certain QOL measures because of variations in culture change implementation. This is not surprising as culture change was initially proposed as a care philosophy rather than a uniform care model (Koren, 2010). Although this review categorized culture change practices into three major domains and a number of subdomains based on the Nursing Home Integrated Model (Hartmann et al., 2013), a lack of detailed description and fidelity measures of the interventions made it difficult to determine how a given culture change practice was implemented by each study. For instance, Bergman-Evans (2004) and Parson (2004) only provided general principles of the Eden Alternative model without giving sufficient details regarding how and to what extent each principle was operationalized. In addition, even the same culture change practices may not be implemented in the same way and to the same level. For instance, in the Green House Model staff empowerment was realized by building a self-managed

nursing assistant team with guides for applying decision-making authority in directing care activities (Kane et al., 2007), whereas in Eden Alternative homes staff empowerment was only approached as an organizational philosophy (Bergman-Evans, 2004; Parsons, 2004).

The amorphous and multifaceted nature of culture change necessitates a comprehensive and domain-specific assessment of culture change practices to ensure the integrity of culture change implementation within or across studies and thereby enable a deep investigation of its effects on QOL (Campbell et al., 2000; Hawe, Shiell & Riley, 2004). Only one study (Murray, 2010) measured multiple culture change domains using the Artifacts of Culture Change Instrument (Bowman & Schoeneman, 2006). In fact, a number of domain-specific measures of culture change practices have emerged as examined in a recent literature review (Sturdevant, Mueller & Buckwalter, 2018). Yet, these tools have been rarely used in intervention studies to evaluate the fidelity of culture change interventions. In addition, repeated measurements are crucial in such studies given culture change is never a one-time and static effort but an evolving and continuous process. However, none of the studies measured culture change implementation repeatedly, which impeded further examining the sustainability of culture change benefits.

Grounding the literature review in the Social Production Function theory facilitated a systematic analysis of diverse QOL measures through categorizing these measures into overall perception of life, and specific instrumental goals for achieving physical well-being and psychosocial well-being. Culture change practices were positively associated with some measures of overall perception of life such as satisfaction with care and satisfaction with life. This corresponds to the broad-based and comprehensive nature of culture change that seeks to not only transform overt facets of care practices, workplace practices, and the physical environment, but

seek to promote a revolutionary change in organizational climate and care philosophy (Zimmerman, Shier & Saliba, 2014). Favorable evidence for overall perception of life was particularly observed in studies implementing comprehensive culture change models such as the Green House Model (Kane et al., 2007; Poey et al., 2017). Poey et al. (2017) also indicated that overall satisfaction with care and life were relatively more evident in nursing homes fully implementing culture change.

Culture change practices were also positively related to autonomy, which was generally referred to as free choices for daily routine activities and was one of the indicators measuring the perception of status concerning if a person is respected by others or self (Ormel, et al., 1999; Ormel et al., 1997). According to other psychological theories such as Self-determination theory, autonomy—the extent to which a person's acts are self-determined instead of being compelled—is one of the basic psychological needs for human beings (Deci & Ryan, 2012). Empirical studies consistently suggested a positively relationship between autonomy and psychosocial well-being for nursing homes residents (Andrew & Meeks, 2018; Kloos, Trompetter, Bohlmeijer & Westerhof, 2018; Chang, 2018). However, the need for autonomy is prone to be comprised in a nursing home context as a result of functional limitations in residents, rigid work schedules and a shortage of workforce in a facility (Heid et al., 2016). With the advocacy for person-centered philosophy and the preferences-based model of care, integrating residents' preferences for daily routine activities into care planning and care delivery has become one of the most commonly implemented culture change practices in nursing homes (Miller et al., 2018; Van Haitsma et al., 2019). While this particular culture change practice is directly related to residents' autonomy, more research is needed to examine whether other culture change practices such as environment transformation and

staff empowerment may have positive effects on autonomy and on other measures of perception of status such as dignity, privacy and individuality.

This review observed less favorable evidence to support the effects of culture change practices on other QOL measures that were associated with behavioral confirmation (being accepted by self or others) and affection (being loved by self or others). Satisfying these psychosocial needs to maintain holistic well-being may require a deeper and more sustained change in organizational culture. While nursing homes tend to start with less laborious and less complex culture change practices such as fulfilling residents' preferences and creating a home-like environment, they may confront challenges to achieve a comprehensive change focusing on a caring and enriched social environment where both residents and staff can thrive (Harrison & Frampton, 2017; Sterns, Miller & Allen, 2010). This calls for organizational and managerial initiatives such as staff education on person-centered care and building a coalition of individuals including personnel from different departments as well as residents and family in order to enhance frontline staff's commitment and knowledge of person-centered care and to promote a broad spectrum of buy-in from all stakeholders (Hartmann et al., 2013). Furthermore, care initiatives such as individualized and meaningful activities and function-focused care are necessary to help residents thrive and continually grow toward their highest potential (Resnick, Galik & Boltz, 2013; Resnick, Galik, Gruber-Baldini & Zimmerman, 2011; Morley, Philpot, Gill & Berg-Weger, 2014; Li & Porock, 2014).

Inconsistency of culture change effects on different QOL measures underscored the importance of a comprehensive QOL measure that captures multiple aspects of nursing home life and various psychosocial needs of residents (Kane, et al., 2007; Murray, 2010; Jones, 2010;

Ruckdeschel et al., 2001; Parsons, 2004). It is theoretically plausible that culture change practices meet different needs of residents and therefore benefit them in different ways (Steverink, Lindenberg & Ormel, 1998). For instance, some residents may gain a sense of purpose from actively taking the responsibility of caring for pets in Eden Alternative homes, while others may gain emotional support through developing an interdependent relationship with pets (Bergman-Evans, 2004; Parsons, 2004). Among all reviewed studies, only five studies used a comprehensive QOL measure (Jones, 2010; Kane et al., 2007; Murray, 2011; Ruckdeschel et al., 2001; Parsons, 2004).

Despite a positive trend regarding the influence of culture change practices, some of the reviewed studies generated non-significant results. Caution is needed to interpret those non-significant results as they were very likely influenced by insufficient statistical power due to a small sample size. Previous studies indicated that the effect size of facility-level factors such as culture change practices on QOL is minimal compared to individual factors such as physical and cognitive function (Shippee et al., 2015). As such, a large sample size is necessary to discern the influence of culture change practices on QOL.

The strength of evidence for the effects of culture change practices on QOL are compromised to some extent by a lack of randomization among the reviewed studies. Potential threats to internal validity may include history threats, maturation/mortality threats, regression threats, and social interaction threats. History threats are not uncommon in studies conducted in nursing homes because real-world settings cannot be fully isolated to avoid events outside of the study intervention. In the reviewed studies, changes in organizational structure (Ruckdeschel et al., 2001; Parsons, 2004) and introductions of other quality improvement projects (Molony et al., 2011)

could confound culture change effects. Maturation/mortality threats were another concern because of the natural decline in physical and cognitive function of residents, which may mask the influence of culture change. High attrition was also common because of death or hospitalizations. Regression threats primarily arose from self-assignment to study groups (Kane et al., 2007; Jones, 2010), which may introduce some extreme samples and cause the regression to the mean. For example, residents with low satisfaction with current care might opt to move in a culture change home, resulting in a potential to overestimate or underestimate the effects of culture change (Burack et al., 2012; Kane et al., 2007; Molony et al., 2011). Social interaction or intervention contamination are likely to occur in studies conducted in facilities from the same provider given shared administration or geographical proximity between intervention and comparison facilities (Parsons, 2004; Kane et al., 2007; Molony et al., 2011; Burack et al., 2012; Grant, 2008).

Despite a non-randomized research design, an effective control of selection bias and confounders is essential to address the threats to internal validity. Studies rated moderate in quality to some extent addressed the methodological concerns by applying analytic strategies such as propensity score matching (Poey et al., 2017), mixed effects models (Poey et al., 2017; Kane et al., 2007; Molony et al., 2011) and difference in difference analysis (Parsons, 2004). These strategies contributed to building comparable samples of residents in intervention and control groups, despite a lack of randomization.

Strength and Limitations of this Review

A strength of this review is its grounding in a pre-defined conceptual framework, which guided the categorization of culture change practices and QOL measures. Although such a framework is crucial for analyzing and synthesizing varied sources (Whittemore & Knafl, 2005),

only relying on a single theoretic framework may lead to an incomplete literature search and biased data synthesis. Nonetheless, both the Nursing Home Integrated Model (Hartmann et al., 2013) and the Social Production Function theory (Ormel, et al., 1999; Ormel et al., 1997) holds promise in offering a comprehensive definitions of nursing home culture change and QOL, and are heuristic in light of potential effects of culture change practices on residents' QOL (Gerritsen et al., 2004). This review was limited by its inability to distinguish the effect of individual culture change domains nor did it test the dose-response relationship due to the heterogeneity in culture change implementation. In addition, this review only included studies conducted in the U.S., which may exclude potential evidence from other countries.

Implications for Future Research and Practice

Findings from this review suggest that rigorous methodological designs are essential for future research to test effects of culture change practices on QOL. Given practical difficulty in conducting randomized controlled trials (RCTs) in nursing home settings, a desirable design could be a cluster RCT or longitudinal designs with concurrent comparison and repeated measures of intervention fidelity and outcomes. Researchers should incorporate rigorous analytic strategies to address selection bias and confounders caused by the absence of randomization. Reliable and valid measures of both QOL and culture change practices are imperative for future research. Examining dose effects and sustainability of culture change effects on QOL should be highlighted in future research. In addition, qualitative or mixed-methods designs may provide deeper insights into how culture change practices benefit QOL.

Culture change practices are promising for improving residents' QOL. Care providers should design culture change practices centering on meeting various psychosocial needs of

residents. It is important to bear in mind that changing the care culture in nursing homes is an evolving process and a continuous endeavor. While addressing basic needs such as comfort, autonomy, dignity, and privacy are important first steps, a deeper and more extensive transformation should be pursued to provide caring social environment in which other psychosocial needs such as affection, personal growth, and purpose of life can be met. Nursing homes culture change initiatives should consider QOL indicators as a component of program evaluation. Moreover, it is imperative for nursing home reimbursement policy to include QOL measures in the quality measure scheme in order to motivate nursing homes to deliver person-centered care.

Conclusion

Although nursing home culture change was initially advocated for improving residents' QOL, the empirical evidence supporting its effects on QOL is still underdeveloped. This review identified a positive trend that culture change practices can influence a resident's QOL. While inconsistent evidence existed for most QOL measures, relatively consistent evidence was found to support positive effects on satisfaction with care, satisfaction with life, and autonomy. However, the methodological weaknesses may undermine the strength of the evidence, which needs to be addressed in future research. Sound empirical evidence will advance knowledge about culture change and QOL, and support care providers and policy makers to make informed decisions towards evidence-based culture change practices.

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Chapter 3 Methods

This chapter provides an overall description of study methods. It contains details of study design, study sample, variables and measures, procedures of data collection, and analytic plans for each study aim.

Study Design and Sample

The sample for this cross-sectional study included all Medicare and/or Medicaid certified NHs (n=363) in Minnesota. This study involved both primary data collection and the use of secondary data. The primary data were collected through an online survey of NH administrators about culture change practices between August 2018 and January 2019. This study surveyed NH administrators in each NH in Minnesota using a comprehensive culture change assessment tool. The detailed description of the survey procedures is provided in the subsequent subsection of data collection. The secondary data were obtained from existing administrative databases provided by the Minnesota Department of Human Services. Among the administrative data, data of structural and organizational NH characteristics was obtained from the 2017 cost reports submitted by facilities to the state. The variables of NH characteristics included profit status, chain affiliation, geographic location, size, occupancy rate, payer mix, staffing. Outcome variables including facility-level risk-adjusted quality measures on resident QOL, family satisfaction, and clinical QIs came from publicly available data published in the 2018 Minnesota Nursing Home Report Care (Minnesota Department of Health and Human Services, 2019). Detailed description of study variables, measures, and data sources is presented in the following sections and in Table 5-1. The culture change survey data were linked to the administrative data (from both the cost reports and

the Minnesota Nursing Home Report Care) for NHs that participated in the only culture change survey.

Variables and Measures

Culture Change Practices

This study conducted an online survey to collect the primary data for the implementation of culture change practices in NHs in Minnesota. The survey instrument was adapted from a culture change assessment tool developed by researchers at Brown University (Miller et al., 2018) (Appendix A). The instrument measures six domains of culture change practices including physical environment (12 items), resident-centered care (9 items), staff empowerment (13 items), staff leadership (10 items), family and community engagement (9 items), and end-of-life care (6 items). Items in the domain of physical environment are measured using a 2-level Likert scale (0-1), and items in other domains are measured using a 3-level Likert scale (0-2). As suggested by the previous use of the instrument (Miller et al., 2018), a composite score was obtained for each domain by summing the raw item scores, and then rescaled to 0-100. The missing value of an item was imputed using the mean of completed items in a given domain if one or two items were missing for that domain (imputations were performed for 1 to 11 NHs per domain). Domain scores were reported as missing if more than two items had missing values (missing domain scores were reported for 5-9 NHs per domain).

The instrument has been validated and used in a national study (Miller et al., 2018). The instrument has satisfactory face and content validity, as it has undergone a rigorous process of item development and scale validation. For instance, experts' input had been incorporated when developing items, and cognitive-based interviews had been conducted to confirm the validity and

feasibility of instrument (Tyler et al., 2011). The omega coefficients were reported as 0.81, 0.87, 0.86, 0.83, 0.91 and 0.90 for the domain of physical environment, resident-centered care, staff empowerment, staff leadership, family and community engagement, and end-of-life care respectively, indicating good internal consistency. Cronbach's alpha of each domain based on the sample for this study ranged from 0.43 for physical environment to 0.79 for family and community engagement (Table 5-1).

In addition, the culture change survey also asked a single question about the overall implementation of culture change practices. The survey provided the following definition: "Culture change or resident-centered care is an effort to make a NH less like an institution and more like a home. Core values include choice for residents, improving quality of care, staff empowerment, and creating a homelike setting." Then, they choose one of the following response categories: (a) there is no discussion around culture change; (b) culture change is under discussion, but we have not changed the way we take care of residents; (c) culture change has partially changed the way we take care of residents in some or all areas of the organization; (d) culture change has completely changed the way we take care of residents in some areas of the organization; (e) culture change has completely changed the way we take care of residents in all areas of the organization; or (f) other (please specify). Using the method applied in previous studies to categorize NHs of different levels of culture change implementation (Miller, Looze, et al., 2014; Miller et al., 2018; Sturla, 2008), the five response categories were recoded as three categories: NHs with no discussion on culture change, or discussion only were considered "traditional NHs" (response a & b); NHs reporting culture change has partially changed the way they take care of residents in some or all areas of the organization were considered "strivers" (response c); NHs reporting culture

change has completely changed the way they take care of residents in some or all areas of the organization were considered "adopters" (response d & e). The three categories were referred to as NH administrator-reported culture change implementation levels.

The culture change survey also included questions asking whether the facility had been redesigned or if some sections had been redesigned into small homes or households that house no more than 8 to 10 or 14 to 20 residents respectively that include kitchens, dining facilities, and common living areas. The answer was coded as 1=implementing small home or household models and 0=not implementing.

Quality Outcomes

Facility-level risk-adjusted quality measures on resident QOL, family satisfaction, and clinical QIs were from publicly available data published in the Minnesota Nursing Home Report Card (Minnesota Department of Human Services, 2019). This study used data from the 2018 Minnesota Nursing Home Report Care. Resident QOL and family satisfaction are collected through face-to-face interviews or surveys with a random sample of residents or family members in every NH. The Minnesota Department of Human Services contracts with an outside research vendor to complete the resident QOL survey and family satisfaction surveys annually (Minnesota Department of Human Services, 2019). Residents are eligible to participate in the QOL survey if they are long-stay residents whose intended stay is longer than 30 days. Residents are excluded from the survey sample if they are severely cognitively impaired, ill, or their primary responsible party has declined the participation on his/her behalf. The integrity of the data of resident QOL and family satisfaction is ensured as the data collection is undertaken by trained staff following standardized protocols and using validated survey instruments (Minnesota Department of Health

and Human Services, 2019). Clinical QIs in ten quality domains are standardized measures of quality of care derived from residents' Minimum Data Set (MDS) assessments. Detailed information on quality measures in Minnesota NHs can be found in the Nursing Home Report Card Technical User Guide (Minnesota Department of Human Services, 2019).

The resident QOL survey uses a standardized instrument that measures eight resident QOL domains including meaningful activities (5 items), food enjoyment (4 items), environment (8 items), dignity (5 items), autonomy (4 items), relationships (4 items), caregiving (9 items), and mood (9 items). Most QOL items are measured using a binary scale (yes or no) except for items in the domain of mood which uses a 5-level Likert scale (Appendix B). The family satisfaction survey measures four domains of satisfaction including staff (8 items), care (12 items), environment (6 items), and food (3 items) (Shippee, Henning-Smith, Gaugler, Held, & Kane, 2017). All family satisfaction items are measured using a 5-level Likert scale (Appendix C). A domain score for resident QOL or family satisfaction is calculated by summing original scores of individual items of the domain and then is rescaled to 0-100 scale with higher scores indicating better outcomes. A summary score of overall resident QOL or family satisfaction for an individual is calculated by taking the average of the domain scores. The QOL and family satisfaction survey instruments have Cronbach's alpha ranging from 0.53-0.77 for resident QOL domains), and 0.86-0.96 for family satisfaction domains (Shippee et al., 2017).

This study used facility-level risk-adjusted scores for resident QOL and family satisfaction (including both domains scores and summary scores), which are calculated by taking the predicted mean of all interviewed or surveyed individuals in the NH based on linear regression modeling adjusting for facility characteristics and resident or family member characteristics that are

generally not a result of provider performance. Hierarchical linear regression modeling is used to account for the variation in the number of surveys per facility. The QOL scores adjust for four residents-level factors including age, gender, cognitive, and ADL, and one facility-level factor—geographic location. The family satisfaction scores adjust for six risk factors, five for respondents (i.e., relationship to the resident, gender, frequency of visits and other communication with the resident, and survey format) and one for nursing homes (i.e., geographic location) (Minnesota Department of Health and Human Services, 2019).

Ten domains of the MDS clinical QIs include psychosocial well-being, physical restraints, continence, infections, accident, nutrition, pain, skin care, use of psychotropic drugs, and physical functioning. Selected items from the MDS have been identified as potential indicators of the quality of care provided to the resident. The Report Card uses 21 QIs to calculate QI scores. The facility QI scores are based on facility rates for the 21 QIs divided into 10 domains. Appendix D presents ten domains of QIs and corresponding MDS items. The facility QI scores are risk-adjusted to account for differences among the residents served in NHs. Examples of the adjustors included age, gender, cognitive performance, Alzheimer's disease, stroke, and ADL (Minnesota Department of Health and Human Services, 2019). Each domain is assigned 10 points. The risk-adjusted total points for each facility is the sum of ten QI domain scores.

NH Structural and Organizational Characteristics

Cost reports submitted by facilities to the Minnesota Department of Human Services were used to obtain data on NH structural and organizational characteristics. The variables included proprietary status (for-profit, non-profit, government-owned), chain affiliation (yes/no), geographic location (metropolitan, micropolitan, rural), size (number of active beds), occupancy

rate (the number of occupied beds divided by the total number of active beds), payer mix (percentage of resident days paid by Medicaid, Medicare, or private insurance), staffing (hours of a given type of staff per resident day). Staffing was calculated for registered nurses, licensed practical nurses, certified nursing assistants, mental health and social work staff, and activity staff.

Data Collection

This study used total population sampling and conducted an online survey to obtain the primary data of culture change implementation across NHs in Minnesota. NH administrators from all Medicare and/or Medicaid certified NHs (n=363) in Minnesota were invited to participate the survey. Qualtrics®, an online survey tool, was used to develop and administer the culture change survey. The survey procedures were developed based on the Social Exchange Theory to maximize the response rate (Dillman, Smyth, & Christian, 2014).

The data collection procedures used to administer the survey had several phases. A pre-notice letter was sent to NH administrators via email one week before the survey was distributed. A pre-notice letter provides a brief introduction of the survey and acquaints participants with the objectives of the survey (Appendix E). A week after the pre-notice letter was sent, an invitation letter with a link to the survey was emailed to NH administrators. The invitation letter provided information about the purposes of the survey, the role of NH administrators in participating in the survey, rewards for completing the survey, voluntariness, and the assurance of confidentiality. Additionally, NH administrators were informed that completing the survey indicated they had provided consent to participate in the research (Appendix F). Two weeks after the initial distribution, a reminder letter with the survey link was emailed to NH administrators who did not respond to the survey.

The University of Minnesota Institutional Review Board reviewed this study and determined it is exempted from human subject research because no personal questions of respondents were involved in the culture change survey and only facility-level data were used (IRB ID: STUDY00003659). The IRB decision letter is provided in Appendix G.

Analysis

This section describes the statistical analyses for the six study aims: (1) describe the implementation of culture change practices in NHs in Minnesota; (2) generate an empirical typology of culture change implementation; (3) examine NH structural and organizational characteristics that are associated with the types of culture change implementation; (4) examine variations in quality outcomes including resident QOL, family satisfaction and clinical QIs across the types of culture change implementation; (5) test the domain-specific relationships of culture change practices with resident QOL and family satisfaction; and (6) examine the moderating effect of small homes or households on these relationships. All analyses were conducted in Stata 15.0 (StataCorp, 2017).

Analysis of Aim 1

Both unweighted and weighted descriptive statistics were applied to describe sample characteristics and culture change survey results. Frequency and percentages were used to characterize categorical variables, and mean and standard error were used to describe continuous variables. The Stata syntax poststrata and postweight under the syvset command was used to adjust for the sample weights and the population size. Post-strata were determined based on profit status (i.e., for-profit, non-profit, government-owned) and geographic locations (i.e., metropolitan, micropolitan, rural), and thus nine post strata were identified.

Analysis of Aims 2, 3, and 4

Latent profile analysis (LPA) was used to generate a typology of culture change implementation. LPA is a probability-based clustering technique that aims to identify hidden groups from observed data of continuous variables using maximum likelihood techniques (Oberski, 2016). It outperforms traditional clustering methods such as K-means by allowing unbiased estimation of profile means and providing various diagnostics for determining numbers of profiles and for comparing models (Magidson & Vermunt, 2002). In the present study, variables used for generating latent profiles included scores of five culture change domains (in a 0-100 scale, i.e., physical environment, staff empowerment and staff leadership, resident-centered care, family and community engagement, and end-of-life care). Staff empowerment and staff leadership were strongly correlated ($r=0.63$, $P<0.05$). Therefore, to ensure the assumption of local independence these two domains were combined by taking the average of the two domain scores. The Stata syntax gsem was used to conduct LPA that was based on Gaussian regression analysis (StataCorp, 2017).

The first analysis step was to establish the optimal number of profiles. Several models with differing numbers of profiles were created and their model fit indices, including log likelihood and Bayesian information criterion (BIC) were compared. Each participating NH was assigned to a profile based on the highest predicted posterior profile probability. Predicted means of culture change scores were generated for each profile. Second, analysis of variance (ANOVA) or Chi-square tests were applied to examine variations in culture change scores and NH characteristics across profiles. Bonferroni tests were conducted to adjust the multiple comparisons across profiles. Finally, a set of regression models were fitted to examine across-profile variations in quality

outcomes, controlling for NH characteristics that may be associated with the quality measures (e.g., profit status, geographic location, chain affiliation, size, occupancy, staffing) (Shippee, Henning-Smith, et al., 2015; Xu, Kane, & Shamliyan, 2013). Sample weight adjustment was applied to all inferential statistics including LPA, ANOVA, Chi-square tests, and regression analyses to ensure generalizability to all NHs in Minnesota.

Analysis of Aims 5 and 6

To test the domain-specific relationships of culture change practices with resident QOL and family satisfaction, this study built a set of linear regression models separately for the summary scores of resident QOL and family satisfaction, and their domain scores. The independent variable was an individual culture change domain (six culture change domains were introduced separately). An interaction between a given culture change domain and small home or household models was added to each regression model to test the moderating effect of small home or household models. Each regression model adjusted for covariates that were found associated with resident QOL and family satisfaction in prior studies (i.e., number of active beds, activity staff hours per resident day, and proportion of Medicaid resident days) (Shippee, Henning-Smith, Rhee, Held, & Kane, 2016; Shippee, Hong, Henning-Smith, & Kane, 2015).

The statistical hypothesis for Aim 5 is that a certain culture change domain is associated with at least one resident QOL domain or family satisfaction domain. As multiple hypothesis tests were performed to test the effect of a certain culture change domain given multiple outcomes (8 resident QOL domains and 4 family satisfaction domains), the results were subjected to increased family-wise error rate (FWR, the probability of making one or more false discoveries or type I errors) in terms of the effect of the culture change domain on resident QOL domain or family

satisfaction. Therefore, this study applied Šidák correction to each test of individual outcome domains to counteract the multiple comparison problem (Abdi, 2007). Given 8 different null hypotheses performed to test the effect of a given culture change domain on resident QOL domains and a familywise alpha level of 0.5, each null hypothesis was rejected that had a p-value lower than $\alpha_{\text{per test of resident QOL domains}} = 1 - (1 - 0.05)^{1/8} = 0.0064$. Likewise, each null hypothesis performed to test the effect of a given culture change domain on family satisfaction domains was rejected that had a p-value lower than $\alpha_{\text{per test of family satisfaction domains}} = 1 - (1 - 0.05)^{1/4} = 0.0127$. Sample weight adjustment was applied to all regression analyses to ensure the results can be generalized to all NHs in Minnesota.

Chapter 4 Implementation of Culture Change Practices in Minnesota NHs

This chapter presents the study results for Aim 1 that was to describe the implementation of culture change practices in NHs in Minnesota. Both unweighted and weighted descriptive statistics were applied to describe sample characteristics and culture change survey scores. Administrators from 102 NHs participated in the culture change survey with a response rate of 28.1%. No significant differences in NH characteristics (i.e., geographic location, profit status, size, occupancy, payer mix, and staffing in registered nurses, licensed practical nurses, mental health or social services staff, and activity staff) and quality outcomes (i.e., clinical QIs, resident QOL, and family satisfaction) were observed between participants and non-participants, except that those completing the survey were less likely to be affiliated with a chain and had slightly higher certified nurse assistant staffing (Table 5-5).

Table 4-1 shows descriptive statistics of NH structural and organizational characteristics for participating NHs and all NHs in Minnesota. Based on the unweighted results, most of the participating NHs were non-profit or government-owned (75.5%) and located in a metropolitan area (56.9%). About half of the participating NHs were affiliated with a chain (49.0%). On average, participating NHs had 76.42±47.37 active beds and a occupancy rate of 0.85±0.12. Participating NHs had nurse staffing of 0.62±0.41 hours per resident day (hprd) for registered nurses, 0.73±0.26 hprd for licensed practical nurses, and 2.42±0.56 certified nursing assistants. In addition, staffing for mental health and social services staff and activity staff was 0.12±0.06 and 0.29±0.13 hprd respectively. In terms of the payer mix, proportions of resident days paid by Medicaid, Medicare, and private insurance or private pay were 53%, 11%, and 36% respectively. The weighed results

for NH characteristics were comparable to the descriptive statistics for the entire population of NHs in Minnesota.

Table 4-2 displays culture change domain scores, NH administrator-reported culture change implementation levels, and the percentage of NHs implementing small home or household models. The highest culture change domains score was end-of-life care (77.74±22.43), followed by resident-centered care (69.14±17.02) and physical environment transformation (64.75±14.66). The culture change domain scores were relatively lower in family and community engagement (27.90±18.81), staff empowerment (38.42±16.87), and staff leadership (39.43±16.74). Scores of items comprising each culture change domain are presented in Appendix H. In terms of NH administrator-reported culture change implementation levels, three quarters of NHs were considered culture change strivers, as their administrators reported culture change had partially changed the NH. While 5.4% of NH administrators reported there was no discussion or discussion only on culture change in their facilities (considered as traditional NHs), 19.4% reported culture change had completely changed in some or all aspects of the NH (considered as adopters). One third of NHs had redesigned all or some sections of the NH into small homes or households that housed no more than 8 to 10 or 14 to 20 residents respectively that included kitchens, dining facilities, and common living areas. The rest of the NHs maintained the traditional architectural structure.

Table 4-1 Characteristics of Participating Nursing Homes and all Nursing Homes in Minnesota

Nursing home characteristics	Participating nursing homes (n=102)				Nursing homes in Minnesota (N=363)	
	n	Percentage			n	Percentage
		Unweighted	Weighted			
Ownership						
For-profit	25	24.5%	31.0%		111	30.6%
Not-for-profit	65	63.7%	60.8%		222	61.2%
Government-owned	12	11.8%	8.2%		30	8.3%
Chain affiliation	50	49.0%	52.4%		216	59.50
Geographic location						
Metropolitan area	58	56.9%	56.2%		204	56.2%
Micropolitan area	18	17.7%	18.9%		68	18.7%
Rural area	26	25.5%	24.9%		91	25.1%
	Unweighted		Weighted		Mean	SE
	Mean	SE	Mean	SE		
Number of active beds	76.42	4.69	76.93	3.99	76.67	2.39
Occupancy	0.85	0.01	0.84	0.01	0.84	0.01
Staffing (hprd)						
Registered nurse	0.62	0.04	0.61	0.03	0.61	0.02
Licensed practical nurse	0.73	0.03	0.74	0.02	0.70	0.01
Certified nursing assistant	2.42	0.06	2.40	0.04	2.28	0.03
Mental health & social services staff	0.12	0.01	0.12	0.00	0.13	0.00
Activity staff	0.29	0.01	0.28	0.01	0.27	0.01
Proportion of Medicaid resident days	0.53	0.02	0.54	0.01	0.55	0.01
Proportion of Medicare resident days	0.11	0.01	0.11	0.01	0.10	0.01
Proportion of private-pay resident days	0.36	0.01	0.35	0.01	0.35	0.01

Table 4-2 Summary of Culture Change Survey Results

Culture change survey results	Unweighted				Weighted	
	Mean	SE	Minimum	Maximum	Mean	SE
Culture Change domain scores						
Physical environment (n=102)	64.75	1.45	16.67	100.00	64.43	1.27
Resident-centered care (n=97)	38.42	1.73	0.00	80.77	37.67	1.57
Staff empowerment (n=97)	39.66	1.71	5.00	85.00	39.42	1.49
Staff leadership (n=96)	69.14	1.74	22.22	100.00	68.72	1.64
Family and community engagement (n=94)	27.90	1.94	0.00	88.89	27.61	1.68
End-of-life care (n=93)	77.74	2.33	8.33	100.00	76.62	2.07
	n	Percentage			Percentage	
Administrator-reported culture change implementation level (n=93)						
Traditional facility	5	5.4%			5.7%	
Striver	70	75.3%			75.6%	
Adopter	18	19.4%			18.7%	
NHs implementing small home or household models (n=102)	35	34.3%			31.6%	

Chapter 5 An Empirical Typology of Nursing Home Culture Change Implementation (Manuscript 2)

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Overview

Culture change in nursing homes (NHs) is a broad-based effort to transform NHs from impersonal institutions to genuine person-centered homes. Culture change practices has been implemented increasingly with varying levels of success. This study (1) generated an empirical typology of culture change implementation across Minnesota NHs using latent profile analysis based on the survey data from administrators in 102 NHs, and (2) examined variations in NH characteristics and quality outcomes associated with the typology. Three types of culture change implementation were identified: high performers, average performers, and low performers. The distributions of culture change scores were distinct

across the three types, with low performers lagging far behind others in family and community engagement, and end-of-life care. High performers were distinguished through demonstrating better resident quality of life and higher family satisfaction. The findings provide empirical support for policymakers, providers and advocates to direct culture change expansion and resource allocation.

Introduction

Culture change in nursing homes (NHs) is a broad-based and continuous effort to transform NHs from impersonal institutions to genuine person-centered homes, giving voices to the people living and working there (Koren, 2010). Culture change practices embrace changes in multiple domains of care including physical environment, resident-centered care, staff empowerment, staff leadership, and family and community engagement (Miller et al., 2014a). The implementation of culture change practices has been increasing in U.S. NHs with varying levels of success (Miller et al., 2018). A growing body of research has emerged to examine the effects of culture change practices on quality of care (Grabowski, Elliot, Leitzell, Cohen, & Zimmerman, 2014a; Shier, Khodyakov, Cohen, Zimmerman, & Saliba, 2014), and resident quality of life (QOL) and satisfaction with care (Hill, Kolanowski, Milone-Nuzzo, & Yevchak, 2011; Kane, Lum, Cutler, Degenholtz, & Yu, 2007; Poey et al., 2017). However, the findings were inconsistent, which may be in part due to difficulties in defining culture change and a wide variation in culture change implementation (Duan, Mueller, Yu, & Talley, 2020; Hill et al., 2011; Shier et al., 2014).

Culture change was initially proposed as a care paradigm, and therefore its operationalization varies substantially across NHs (Rahman et al., 2008). A heuristic typology that is solely based on opinions of NH administrators or other external evaluators was commonly used to identify the types of culture change implementation (e.g., full adopters, partial adopters, strivers, or non-adopters) (Grabowski et al., 2014a; Grant, 2008; Miller et al., 2014a; Poey et al., 2017; Zimmerman et al., 2013). However, the heuristic approach is limited because it may be subject to response bias or low replicability (Winch, 1947). An empirical typology that is derived from data of systematic measures of culture

change has not been attempted. Contrary to a heuristic typology, an empirical typology applies statistical techniques based on empirical measures, and has been widely used in social research to study complex and dynamic phenomena (Winch, 1947).

Accordingly, generating an empirical typology of culture change implementation in NHs requires a comprehensive and valid measure of culture change practices. A number of domain-specific measures of culture change practices in NHs have emerged (Sturdevant, Mueller, & Buckwalter, 2018). However, existing studies using these standardized measures tended to examine culture change domains separately or sum all subscales to determine the overall adoption level (Chisholm et al., 2018; Miller et al., 2018; Sullivan et al., 2013). Identifying an empirical typology of culture change implementation by looking beyond a single aspect of practices will help care providers and policymakers make informed decisions toward allocating optimal resources and directing tailored interventions for NHs at a certain stage of culture change implementation.

A further examination of variations in NH characteristics and quality outcomes across the types of culture change implementation is crucial to fully inform the implementation of evidence-based culture change initiatives. A gap in the literature was the lack of voices from residents and family members speaking to the influence of culture change (Duan et al., 2020; Hill et al., 2011; Shier et al., 2014). Despite widely acknowledged face validity that culture change improves QOL and satisfaction, few studies have examined these resident- and family-reported outcomes (Hill et al., 2011; Shier et al., 2014). This may be likely due to a lack of QOL indicators in the current quality metrics for NH care (Castle & Ferguson, 2010). Minnesota is useful for this study because it is one of the few states that integrates resident-reported QOL and family-reported satisfaction in its

quality measure system (Minnesota Department of Human Services, 2019), which enables a systematic examination of QOL and satisfaction as outcomes of culture change implementation.

To address the knowledge gaps, this study aimed to (1) generate an empirical typology of culture change implementation using latent profile analysis, (2) examine NH structural and organizational characteristics that are associated with the types of culture change implementation, and (3) examine variations in quality outcomes including clinical quality indicators (QIs), resident QOL, and family satisfaction across the types of culture change implementation.

Methods

Sample

This cross-sectional study used data from an online culture change survey and administrative data of NHs in Minnesota. The survey was administered to NH administrators in all Medicare-and/or-Medicaid-certified NHs in Minnesota (n=363) through an online survey tool between August 2018 and January 2019. Administrative data were obtained from the Minnesota Department of Human Services and consisted of NH characteristics and quality measures. The University of Minnesota Institutional Review Board reviewed this study and determined it was exempted from human subject research because no personal questions of respondents were involved in the survey and only facility-level data were used.

Study Variables and Data Sources

Culture change practices. The survey instrument was adapted from a culture change assessment tool developed by researchers at Brown University (Miller et al., 2014a). The tool measures six domains of culture change practices including physical environment, staff empowerment, staff leadership, resident-centered care, family and community engagement, and end-of-life care. Table 5-1 lists items comprising each domain. Items in the domain of physical environment were measured using a 2-level Likert scale, and items in other domains were measured using a 3-level Likert scale. As suggested by the previous use of the instrument (Miller et al., 2018), a composite score was obtained for each domain by summing the raw item scores, and then were rescaled to 0-100. The missing value of an item was imputed using the mean of completed items in a given domain if one or two items were missing for that domain (imputations were performed for 1 to 11 NHs per domain). Domain scores were reported as missing if more than two items had missing values (missing domain scores were reported for 5-9 NHs per domain). This instrument has been validated with satisfactory content validity and high internal consistency (Miller et al., 2018; Tyler et al., 2011). Cronbach's alpha of each domain based on the current sample ranged from 0.43 for physical environment to 0.79 for family and community engagement (Table 5-1).

The survey also asked a single question about overall culture change implementation level as perceived by NH administrators (Miller et al., 2014a). The responses were categorized as traditional facility (there is no discussion around culture change or culture change is under discussion but no change in care delivery occurs), striver (culture change has partially changed care delivery in some, or all areas of the organization),

and adopter (culture change has completely changed care delivery in some or all areas of the organization).

NH structural and organizational characteristics. Cost reports submitted by facilities to the Minnesota Department of Human Services were used to obtain data of several structural and organizational NH characteristics known to be associated with the implementation of culture change practices (Miller et al., 2014a; Miller et al., 2018). These variables included profit status, chain affiliation, geographic location, size, occupancy rate, payer mix, staffing (Table 5-1).

Quality outcomes. Facility-level risk-adjusted quality measures on resident QOL, family satisfaction, and clinical QIs were from publicly available data published in the Minnesota Nursing Home Report Card (Minnesota Department of Human Services, 2019). Resident QOL and family satisfaction are collected through face-to-face interviews or surveys with a random sample of residents or family members in every NH (Table 5-1). The Minnesota Department of Human Services contracts with an outside research vendor to complete these interviews and surveys annually (Minnesota Department of Human Services, 2019). The QOL and family satisfaction survey instruments have been validated with respect to validity and reliability with Cronbach's alpha ranging from 0.53-0.77 for resident QOL domains (Kane et al., 2003), and 0.86-0.96 for family satisfaction domains (Shippee, Henning-Smith, Gaugler, Held, & Kane, 2017). Facility-level QOL scores and family satisfaction scores that used the average score of interviewed individuals were risk-adjusted to control for individual and facility characteristics that were generally not a result of provider performance. The QOL scores adjust for four residents-level factors including age, gender, cognitive and activities of daily living (ADL) and one facility-level factor—

geographic location; the family satisfaction scores adjust for six risk factors, five for respondents (i.e., relationship to the resident, gender, frequency of visits and other communication with the resident, and survey format) and one for nursing homes (i.e., geographic location) (Minnesota Department of Human Services, 2019).

Clinical QIs in ten quality domains were derived from residents' Minimum Data Set (MDS) assessments (Table 5-1). The MDS clinical QI scores were risk adjusted to account for differences among the residents served in NHs. Examples of the adjustors included age, gender, cognitive performance, Alzheimer's disease, stroke, and ADL (Minnesota Department of Human Services, 2019)

Table 5-1 Study Variables and Data Sources

Variables	Measures/coding	Data Sources
Culture change practices		
Physical environment (alpha=0.43)	12 items (e.g., private rooms, outdoor spaces, open kitchen and dining, eliminate nurse station and overhead page); 0-100	Online survey of MN nursing home administrators by the authors
Staff empowerment (alpha=0.76)	13 items (e.g., self-managed work schedules, cross-training, consistent staff assignment, rewards for extra education); 0-100	
Staff leadership (alpha=0.63)	10 items (e.g., formal opportunities for CNAs to participate in management activities, in-service education); 0-100	
Resident-centered care (alpha=0.58)	9 items (e.g., residents' involvement in determining their schedules, activities, and care); 0-100	
Family and community engagement (alpha=0.77)	9 items (e.g., formal opportunities for family and community members to participate in care and social activities); 0-100	
End-of-life care (alpha=0.70)	6 items (e.g., fulfill various needs of a terminally ill resident, provide emotional support for family members); 0-100	
Administrator-reported CC	Three categories including traditional facility, striver, or adopter	
Structural and organizational characteristics		
For profit	Yes/no	2017 Cost Reports submitted by facilities to the MN Department of Human Services
Affiliated with a chain	Yes/no	
Geographic location	Three categories including metropolitan, micropolitan, and rural	
Size	Number of active beds	
Occupancy rate	Number of occupied beds divided by total number of active beds	
Payer mix	Percentage of resident days paid by a certain payer (Medicaid, Medicare, private insurance or private pay)	
Staffing	Hours of certain type of staff per resident day (RNs, LPNs, CNAs, mental health and social work staff, and activity staff)	
Quality outcomes		
Resident QOL summary score	Average of eight QOL domain scores; 0-100	2018 MN Nursing Home Report Card
Resident QOL domain scores		
Meaningful activities	5 items (e.g., enough scheduled and enjoyable activities); 0-100	
Food enjoyment	4 items (e.g., enjoy the food, menu changes enough); 0-100	
Environment	8 items (e.g., easy to get around, enough privacy, feel safe); 0-100	

Table 5-1 Study Variables and Data Sources (Continued)

Variables	Measures/coding	Data Sources
Dignity	5 items (e.g., staff listen to residents, treat residents politely); 0-100	
Autonomy	4 items (e.g., choose time to get up, express preferences); 0-100	
Relationships	4 items (e.g., staff stop by just to talk); 0-100	
Caregiving	9 items (e.g., get help in a timely way); 0-100	
Mood	9 items (e.g., often feel angry, bored, or happy, relaxed); 0-100	
Family satisfaction summary score	Average of four satisfaction domain scores; 0-100	2018 MN Nursing Home Report Card
Family satisfaction domain scores		
Care	12 items (e.g., include family's opinions in care planning); 0-100	
Staff	8 items (e.g., staff know residents, staff's attitude); 0-100	
Environment	6 items (e.g., smell, cleanliness, safety); 0-100	
Food	3 items (e.g., quality of food, atmosphere at mealtime); 0-100	
Clinical QI summary score	Sum of ten clinical QI domain scores; 0-100	2018 MN Nursing Home Report Card
Clinical QI domain scores [a]		
Psychosocial	Behavior or depressive symptoms; 0-10	
Physical restraints	Use of physically restraints; 0-10	
Continence	Bowel or bladder incontinence, indwelling catheters; 0-10	
Infections	Urinary tract infections or other infections; 0-10	
Accident	Falls with major injury; 0-10	
Nutrition	Unexplained weight loss; 0-10	
Pain	Moderate to severe pain; 0-10	
Skin care	Pressure sores; 0-10	
Psychotropic drugs	Use of antipsychotics without a diagnosis of psychosis; 0-10	
Physical functioning	Functional or mobility dependence; 0-10	

Notes. RNs: registered nurses; LPNs: licensed practical nurses; CNAs: certified nursing assistants; QOL: quality of life; QI: quality indicator; MN: Minnesota; a. The original measure of a clinical QI domain is the percentage of residents with certain conditions. Raw percentages were risk-adjusted and rescaled to 0-10 points with higher scores indicating better outcomes.

Analytic Plan

Latent profile analysis was used to generate a typology of culture change implementation. Latent profile analysis is a probability-based clustering technique that aims to identify hidden groups from observed data of continuous variables using maximum likelihood techniques (Oberski, 2016). It outperforms traditional clustering methods such as K-means by allowing unbiased estimation of profile means and providing various diagnostics for determining numbers of profiles and for comparing models (Magidson & Vermunt, 2002). In the present study, variables used for generating latent profiles included scores of five culture change domains (in a 0-100 scale, i.e., physical environment, staff empowerment and staff leadership, resident-centered care, family and community engagement, and end-of-life care). Staff empowerment and staff leadership were strongly correlated ($r=0.63$, $P<0.05$). Therefore, to ensure the assumption of local independence these two domains were combined by taking the average of the two domain scores.

The first analysis step was to establish the optimal number of profiles. To do this several models with differing numbers of profiles were created and their model fit indices, including log likelihood and Bayesian information criterion (BIC), were compared. Each participating NH was assigned to a profile based on the highest predicted posterior profile probability. Predicted means of culture change scores were generated for each profile. Second, analysis of variance (ANOVA) or Chi-square test were applied to examine variations in culture change scores and NH characteristics across profiles. Bonferroni tests were conducted to adjust the multiple comparison across profiles. Finally, a set of regression models were fitted to examine across-profile variations in quality outcomes, controlling for NH characteristics that may be associated with the quality measures (e.g.,

profit status, geographic location, chain affiliation, size, occupancy, staffing) (Shippee, Henning-Smith, Kane, & Lewis, 2015; Xu, Kane, & Shamliyan, 2013). Post-stratification was applied in ANOVA, Chi-square tests, and regression analyses to adjust the sampling weights so that they sum to the population sizes within each post-stratum. Post-strata were determined based on profit status and geographic locations. All analyses were conducted in Stata 15.0 (StataCorp, 2017).

Results

Administrators from 102 NHs participated the survey with a response rate of 28.1%. No significant differences in NH characteristics (i.e., geographic location, profit status, size, occupancy, payer mix, and staffing in registered nurses, licensed practical nurses, mental health or social services staff , and activity staff) and quality outcomes (i.e., clinical QIs, resident QOL, and family satisfaction) were observed between participants and non-participants, except that participants were less likely to be affiliated with a chain and had slightly higher certified nurse assistant staffing (supplementary Table 5-5). Most of the participating NHs were non-profit or government-owned (75.5%) and located in metropolitan area (56.9%). About half of the participating NHs were affiliated with a chain (49.0%). On average, participating NHs had 76 active beds (range=14-320), 85% occupancy rate (range=35.2%-98.9%), and 53% Medicaid resident days (range=0.2%-91.9%). The highest culture change domains score was end-of-life care (77.74 ± 22.43), followed by resident-centered care (69.14 ± 17.02) and physical environment (64.75 ± 14.66). The culture change domain scores were relatively lower in family and community

engagement (27.90 ± 18.81), staff empowerment (38.10 ± 16.87), and staff leadership (39.43 ± 16.74).

An empirical typology with three types of culture change implementation was generated based on the latent profile analysis. The three-profile model had the best model fit (log likelihood=-1998.20, BIC= 4098.15) compared to models with two (log likelihood=-2015.39, BIC= 4104.78), four (log likelihood= -1990.49, BIC= 4110.48), or five profiles (log likelihood=-1988.58, BIC= 4134.40). Figure 5-1 presents predicted means of five culture change domain scores for the three types of culture change implementation, labeled as low performers, average performers, and high performers. According to the predicted latent profile probabilities, about 14.19% NHs were classified as low performers, 54.92% were average performers, and 30.89% were high performers.

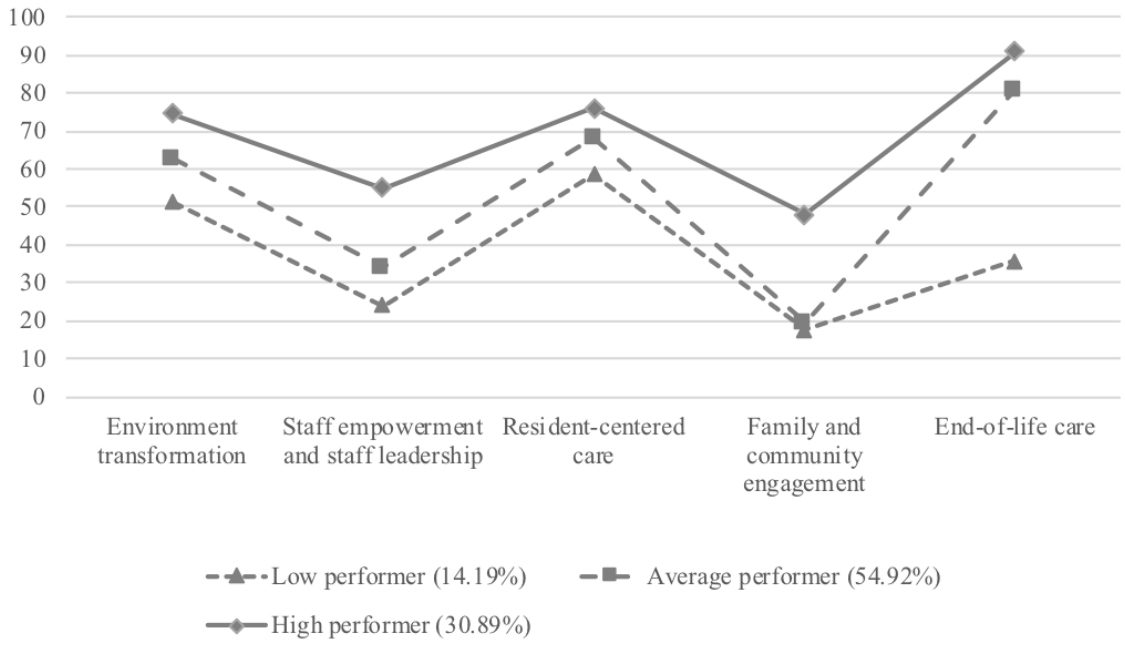

Figure 5-1 Predicted Means of Culture Change Scores by Latent Profiles

Table 5-2 presents culture change scores across the types of culture change implementation. All culture change scores varied significantly across the three types with F=13.64-127.66 (P<0.001). According to multiple comparisons with Bonferroni correction, each type was statistically different from one another in four culture change scores including physical environment, staff empowerment and staff leadership, resident-centered care, and end-of-life care. In general, higher levels of performance were associated with higher culture change scores. No statistical difference was found between low performers and average performers in family and community engagement. As shown in the first four rows of Table 5-3, administrator-reported culture change levels were significantly associated with the empirical typology. About 79% low performers and 88% average performers were self-identified as strivers. While 44% high performers were self-identified as adopters, about half of them were self-identified as strivers.

Table 5-2 Culture Change Scores by the Types of Culture Change Implementation

	Low performer (n=13)		Average performer (n=59)		High performer (n=30)		F
	Mean	SE	Mean	SE	Mean	SE	
Environment transformation	50.63	2.66	61.41	1.56	75.40	1.48	52.54***
Staff empowerment and staff leadership	23.98	2.31	34.44	1.26	53.71	1.68	81.45***
Resident-centered care	59.85	4.07	66.79	1.68	77.39	2.04	13.64***
Family and community engagement[a]	17.25	3.25	19.60	1.22	49.48	2.52	63.59***
End-of-life care	33.62	3.46	80.61	1.68	89.86	1.63	127.66***

Notes: Weighted results are presented. SE is the linearized standard error. Bonferroni tests were conducted for multiple-comparison in ANOVA. Each profile statistically different from one another in all culture change scores except for family and community engagement. a: No statistical difference was found in family and community engagement between low performers and average performers. *** P <0.001

Table 5-3 shows NH characteristics by the three types of culture change implementation. Bonferroni-corrected multiple comparisons indicated that low performers had a higher proportion of Medicaid resident days, but a lower proportion of private-pay resident days compared to average performers.

Table 5-4 presents variations in quality outcomes across the types of culture change implementation after controlling for NH characteristics. High performers had significantly better outcomes in QOL summary score and all QOL domains scores compared to average performers. High performers also reported higher scores in four QOL domains including meaningful activity, environment, dignity, and autonomy than low performers. In addition, high performers reported higher family satisfaction scores in domains of environment and food compared to both lower performers and average performers. With respect to clinical QIs, high performers demonstrated significantly better outcomes in the use of physical restraints and skin care, but reported a poorer outcome in accidental falls compared to low performers.

Table 5-3 Nursing Home Characteristics by the Types of Culture Change Implementation

	Low performers (n=13)		Average performers (n=59)		High performers (n=30)		F/Chi^2
	Mean/ %	SE	Mean/ %	SE	Mean/ %	SE	
Administrator-reported culture change level							
Traditional	17.13%		3.77%		3.95%		20.89***
Striver	78.92%		87.67%		51.58%		
Adopter	3.94%		8.58%		44.47%		
Geographic location							
Metropolitan	61.12%		58.75%		49.01%		2.72
Micropolitan	25.51%		14.41%		24.57%		
Rural	13.29%		26.84%		26.42%		
For-profit	38.44%		30.96%		31.56%		2.36
Affiliated with a chain	62.62%		47.00%		62.46%		2.63
Number of active beds	98.67	18.53	73.70	4.64	76.07	6.51	1.06
Occupancy	0.84	0.01	0.85	0.01	0.82	0.02	0.24
Staffing (HPRD)							
Registered nurse	0.63	0.14	0.54	0.02	0.65	0.05	0.23
Licensed practical nurse	0.73	0.05	0.74	0.03	0.74	0.04	0.19
Certified nursing assistant	2.47	0.20	2.34	0.06	2.41	0.07	0.08
Mental health & social services staff	0.13	0.01	0.12	0.01	0.13	0.01	0.61
Activity staff	0.29	0.02	0.29	0.01	0.28	0.02	0.12
Proportion of Medicaid resident days [a]	0.59	0.02	0.52	0.02	0.57	0.03	4.49*
Proportion of Medicare resident days	0.10	0.01	0.10	0.01	0.09	0.01	1.63
Proportion of private-pay resident days [b]	0.31	0.02	0.38	0.01	0.34	0.02	3.68*

Notes: Weighted results are presented. SE is the linearized standard error. Bonferroni tests were conducted for multiple-comparison in ANOVA. a: Low performers had a significantly higher proportion of Medicaid resident days compared to average performers (P=0.004). b: Low performers had a significantly lower proportion of resident days paid by private insurance or others compared to average performers (P=0.008). HPRD=hours per resident day; *P<0.05; ** P<0.01; *** P<0.001

Table 5-4 Regression Analyses: Quality Outcomes by the Types of Culture Change Implementation (Reference Group=High Performers)

	Low performers		Average performers	
	B	95% CI	B	95% CI
Clinical QIs				
Clinical QI summary score	-0.34	(-6.01, 5.34)	-3.81	(-7.67, 0.05)
Psychosocial	0.22	(-0.72, 1.16)	0.16	(-0.57, 0.89)
Physical restraints	-0.5	(-1.20, 0.21)	-1.49***	(-2.33, -0.65)
Continence	0.03	(-0.73, 0.80)	-0.48	(-1.11, 0.15)
Infections	0.00	(-1.21, 1.22)	-0.42	(-1.25, 0.41)
Accident	1.35*	(0.06, 2.64)	0.25	(-0.77, 1.28)
Nutrition	-0.75	(-2.10, 0.59)	0.05	(-0.97, 1.07)
Pain	0.47	(-0.90, 1.84)	-0.65	(-1.66, 0.37)
Skin care	-0.44	(-1.38, 0.50)	-0.88*	(-1.61, -0.15)
Psychotropic drugs	-0.81	(-2.23, 0.61)	-0.37	(-1.44, 0.70)
Physical functioning	-0.25	(-1.10, 0.61)	-0.58	(-1.26, 0.09)
Resident QOL				
QOL summary score	-1.45**	(-2.46, -0.44)	-1.85***	(-2.54, -1.16)
Meaningful activities	-2.34*	(-4.39, -0.30)	-2.30***	(-3.58, -1.01)
Food enjoyment	-2.20	(-4.52, 0.13)	-3.03***	(-4.62, -1.44)
Environment	-1.62**	(-2.73, -0.50)	-1.04**	(-1.82, -0.26)
Dignity	-1.32***	(-1.96, -0.68)	-1.13***	(-1.60, -0.66)
Autonomy	-1.52*	(-2.76, -0.28)	-2.11***	(-2.96, -1.26)
Relationships	-0.45	(-2.09, 1.18)	-2.11***	(-3.24, -0.98)
Caregiving	-1.70	(-3.41, 0.01)	-2.37***	(-3.67, -1.07)
Mood	0.17	(-1.04, 1.39)	-0.99	(-2.13, 0.16)
Family satisfaction				
Satisfaction summary score	-2.22	(-4.66, 0.23)	-1.47	(-3.17, 0.23)
Satisfaction with care	-0.98	(-3.36, 1.40)	-1.17	(-2.86, 0.51)
Satisfaction with staff	-1.00	(-3.50, 1.49)	-0.75	(-2.38, 0.89)
Satisfaction with environment	-3.98**	(-6.84, -1.13)	-2.05*	(-4.03, -0.06)
Satisfaction with food	-2.77*	(-5.17, -0.36)	-1.73*	(-3.34, -0.12)

Notes. Weighted results are presented. The regression analyses controlled for covariates including geographic location, profit status, chain affiliation, number of active beds, occupancy, staffing (including licensed practical nurses, certified nursing assistants, mental health and social service staff, activity staff) and the percentage of Medicaid resident days. Complete presentation of the regression analyses can be found in the supplementary Table 5-6, 5-7, 5-8. *P<0.05; ** P<0.01; *** P<0.001.

Discussion

The prevalence of culture change practices in Minnesota NHs was comparable to that of a national representative sample of NHs (Miller et al., 2018), wherein culture change practices associated with resident-centered care, physical environment transformation and end-of-life care were more frequently implemented than practices associated with staff empowerment, staff leadership, and family and community engagement. This study, looking beyond individual culture change domains, integrated the multidimensional measures of culture change practices to identify an empirical typology of culture change implementation. Three types of culture change implementation were identified across Minnesota NHs. High performers appeared the most comprehensive in adopting all culture change domains, and they were particularly distinguished from others by their excellent performance in family and community engagement. Conversely, low performers reported lowest scores in all culture change domains, and they particularly lagged behind in end-of-life care. Average performers were moderate in implementing culture change domains including environment transformation, staff empowerment and staff leadership, and resident-centered care. Yet, they had the end-of-life care score comparable to high performers and the family and community engagement score close to low performers.

The findings were consistent with previous studies that suggested NHs are at different stages in implementing culture change practices, reflecting the progressive nature of culture change in a NH (Miller et al., 2014a; Miller et al., 2018). However, previous studies tended to ask informants such as NH administrators or directors of nursing to gauge the overall level of culture change implementation. To this end, the present study revealed

that the empirical typology based on latent profile analysis was associated but not completely consistent with administrator-reported culture change levels, namely the heuristic typology. A substantial portion of NHs identified as traditional facilities or strivers by their administrators were actually classified as high performers in our typology. In contrast, some administrators were less conservative as they identified their facilities as adopters which fell into the category of average performers in our typology. The inconsistency between the heuristic and empirical culture change typologies is likely due to variations in NH administrators' personal knowledge, practical experiences, and expectations of culture change practices. In prior qualitative interviews, NH administrators have discussed various motivations, challenges faced, and strategic plans for the culture change implementation in their facilities (Shield, Looze, Tyler, Lepore, & Miller, 2014). Administrators may use the relevant information in an implicit manner when gauging the level of culture change implementation and base the gauge on their own scales (comparing themselves to some ideal culture change models or comparing their current status to their past status). In contrast, the empirical typology, based on empirical measures of culture change practices and statistic techniques, maximizes both within-group homogeneity and between-group heterogeneity in terms of the implementation of multiple culture change domains. This may explain why the administrator-reported culture change levels were not as sensitive as the empirical typology in the tests of NH characteristics and quality outcomes associated with culture change implementation (the results are available upon request).

While some culture change domains including physical environment transformation, staff empowerment and staff leadership, and resident-centered care

demonstrated an even hierarchical distribution across the three types, family and community engagement and end-of-life care appeared extremely high or low in certain groups of NHs. This finding was not surprising because culture change practices associated with family and community engagement and end-of-life care have not been advocated as widely as other culture changes practices by professional organizations and regulation agencies (Rahman et al., 2008). For instance, resident-centered care practices that emphasize honoring residents' preferences has been mandated by federal regulations (Centers for Medicare & Medicaid Services, 2016). Home-like environments and empowering direct staff have also been extensively promoted by those leading culture change models such as the Green House Project, the Household Model by Action Pact, the Wellspring Model (Cohen et al., 2016; Hill et al., 2011; Kehoe & Van Heesch, 2003). Moreover, initiatives in family and community engagement and end-of-life care involve more stakeholders, more expertise, but less immediate outcomes (Puurveen, Baumbusch, & Gandhi, 2018; Schwartz, Lima, Clark, & Miller, 2019; Zimmerman et al., 2013). The complexities involved in these initiatives may hinder their expansion in NHs that are at an early stage of culture change implementation (Sterns et al., 2010). Although more empirical evidence is needed (particularly for the effects of community engagement), existing studies have demonstrated the beneficial influence of family engagement and resident-and-family-centered end-of-life care on resident, family, and staff outcomes (Hanson, Reynolds, Henderson, & Pickard, 2005; Zimmerman et al., 2013). Given such complex culture change initiatives were scarcely embraced by low and/or average performers, additional support from policies, resources, and expertise should be offered to help these NHs achieve comprehensive culture change.

The finding that culture change implementation was associated with payer mix was in line with previous studies (Chisholm et al., 2018; Grabowski et al., 2014a; Miller et al., 2018). The findings from previous studies using the national data or the data of other states may reflect the fact that culture change requires considerable financial resources (Chisholm et al., 2018; Grabowski et al., 2014a; Miller et al., 2018), and higher pay from Medicare and private payers versus Medicaid may facilitate culture change implementation (Chisholm et al., 2018; Lepore et al., 2015; Shield, Looze, Tyler, Lepore, & Miller, 2014). However, in Minnesota, NHs cannot charge private-pay residents more than the Medicaid rate, with the exception of private rooms and special services (Minnesota House Research Department, 2016). As a result, factors contributing to the association between culture change adoption and payer mix for Minnesota NHs could be other facilitators such as higher occupancy rates, higher staffing, better quality outcomes in NHs with less Medicaid residents and more private-pay residents (referred to as high-tier NHs) (Mor, Zinn, Angelelli, Teno, & Miller, 2004).

Consistent with previous studies, the present study indicated a higher level of culture change implementation was associated with lower rates of restraint use and pressure ulcers but a higher rate of accidental falls (Coleman et al., 2002; Miller, Lepore, Lima, Shield, & Tyler, 2014b; Ransom, 2000). It was still worth noting that other clinical outcomes did not show significant variations across the types of culture change implementation, which was in accordance with previous studies reporting only few clinical outcomes associated with culture change implementation (Grabowski et al., 2014b; Miller et al., 2014b). This may be related to the fact that culture change efforts do not focus on a given clinical outcome or a certain dimension of care but on the holistic well-being of

residents and staff (Grabowski et al., 2014b). Nonetheless, person-centered value embedded in culture change practices may help shape staff's norms which encourage giving priority to resident dignity, autonomy, and overall well-being in care delivery (Loe & Moore, 2012; Munroe, Kaza, & Howard, 2011). This may explain why high performers had a relatively lower rate of restraint use but a higher rate of accidental falls (as residents may be granted more autonomy for transferring and activities of daily living) (Coleman et al., 2002; Gastmans & Milisen, 2006; White-Chu, Graves, Godfrey, Bonner, & Sloane, 2009). In addition, culture change practices that promote staff empowerment and close resident-staff relationships may contribute to staff monitoring resident's skin condition more closely and being more attentive to resident needs (Ransom, 2000). Qualitative research using data from field observations or in-depth interviews will be helpful to understand how care value and care delivery process is transformed in culture change NHs that may affect quality outcomes, particularly for outcomes demonstrating a direction of change opposite to the hypothesis.

One contribution to the evidence base regarding the benefits of culture change on residents' well-being is the finding that high performers consistently reported better QOL of all domains relative to average performers and/or low performers. Although more rigorous research is needed, previous studies suggested that culture change practices improve residents' overall satisfaction and foster a sense of being respected in terms of autonomy, privacy, dignity, and personal preferences (Burack, Reinhardt, & Weiner, 2012; Grant, 2008; Kane et al., 2007; Poey et al., 2017). The benefits on QOL were primarily observed in comprehensive and sustained culture change implementation such as the Green House Model (Burack et al., 2012; Grant, 2008; Kane et al., 2007; Poey et al., 2017). In

the Kansas pay-for-performance program targeting person-centered care, only participating facilities that have reached the highest stage of culture change (as measured with Stage 1 " foundation level" – Stage 5 " full implementation) reported significantly higher resident-reported QOL and higher satisfaction as compared to non-implementers (Poey et al., 2017). High performers identified by the present study demonstrated the most comprehensive culture change implementation and they even gained some momentum in practices associated with family and community engagement and resident-and-family-centered end-of-life care, two culture change domains that appeared challenging for average performers and low performers. In high-performing NHs, the culture change implementation may not be limited to structural and procedural changes but rather have achieved a level at which the person-centered value has been embedded into staff's care philosophy and routinized into daily practices, which in turn improves resident QOL.

The finding that being high performers was associated with better family satisfaction was consistent with previous research. Two studies on the Eden Alternative indicated that family members' overall satisfaction increased after two-year of the model implementation (Ransom, 2000; Robinson & Rosher, 2006). Of particular interest about the finding of the present study was that only two domains of satisfaction (i.e., environment, food) were found significantly higher in high performers. While family members might witness those tangible changes in the environment and food services in high-performing NHs and thus experienced improved satisfaction, they might remain critical of other aspects of care (i.e., family involvement in resident care, communication with staff, staff attitude and respect toward the resident). This highlights the significance of resident- and family-centered culture change practices that improve family satisfaction overall given the

growing recognition of the family members' role in NH care (Gaugler, 2005; Shippee et al., 2017) These practices may need to focus on promoting family involvement in resident care and establishing interactive and partnered relationships between staff and family members (Gaugler, 2005; Shippee et al., 2017).

Limitations, Directions for Future Research, and Implications for Practice

Some limitations of this study should be addressed in future research. Small sample size may reduce statistical power to examine subtle aspects of the typology and to test differences in facility characteristics and quality measures across types of culture change implementation. Despite a low response rate, negligible nonresponse bias in regard to NH characteristics and the application of weight adjustment may increase the generalizability of the findings to all NHs in Minnesota. Nonetheless, the findings cannot be generalized to all U.S. NH. A national sample of NHs is needed to generate typologies of culture change implementation at a national level. In addition, potential social desirability bias may undermine the validity of data, although previous studies have found NH administrators are credible when answering the survey items (Shield, Tyler, Berridge, Clark, & Miller, 2018). Direct care staff and staff from multiple departments should be included in future studies to assess culture change practices in a more comprehensive manner. Finally, this study only examined a cross-sectional snapshot of culture change implementation. Future research should consider longitudinal designs to examine cause-effect relationships between culture change implementation and quality outcomes, and to test the sustainability of the effects.

The findings have several implications for practice. The existing three types of culture change implementation could guide resource allocation. For example, resources to

support low and average performers need to particularly focus on family and community engagement, and resident-and-family-centered end-of-life care. Changes of care philosophy, besides changes of physical and operational aspects of care processes, should be emphasized in actions of promoting and implementing culture change practices in low and average performing NHs. The positive relationships between culture change implementation and quality outcomes (particularly QOL and satisfaction outcomes) support actions of policymakers, care providers and advocates to promote culture change extensively within or across NHs.

Conclusion

NHs have been committed to implementing culture change practices but with varying levels of success. This study generated a typology of culture change implementation based on empirical data. NHs with different types of culture change implementation demonstrated variations in organizational characteristics and quality outcomes. The findings highlight the value of the empirical typology approach to identifying types of culture change implementation across NHs based on comprehensive measures of culture change practices. The typology will provide empirical support for policymakers, care providers and advocates to direct culture change expansion and resource allocation.

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Supplementary Material for Manuscript 2

Table 5-5 (Supplementary) Nursing Home Characteristics: Comparisons between Participants and Nonparticipants

	Nonparticipants (n=261)		Participants (n=102)		F/Chi^2	P
	Mean/%	SD	Mean/%	SD		
Geographic location						
Metropolitan	56.11%		56.44%		0.09	0.96
Micropolitan	19.08%		17.82%			
Rural	24.81%		25.74%			
For-profit	33.46%		24.51%		2.75	0.10
Affiliated with a chain	63.88%		49.02%		6.75	<0.01
Number of active beds	76.78	44.77	76.42	47.37	0.00	0.94
Occupancy	0.84	0.10	0.85	0.12	0.08	0.78
Staffing (hours per resident day)						
Registered nurse	0.60	0.46	0.62	0.41	0.18	0.67
Licensed practical nurse	0.69	0.28	0.73	0.26	1.48	0.22
Certified nursing assistant	2.23	0.51	2.42	0.56	10.16	<0.01
Mental health & social services staff	0.14	0.10	0.12	0.06	2.48	0.11
Activity staff	0.26	0.11	0.29	0.13	2.59	0.11
Proportion of Medicaid resident days	0.56	0.17	0.53	0.18	1.54	0.22
Proportion of Medicare resident days	0.10	0.10	0.11	0.10	0.03	0.85
Proportion of private-pay resident days	0.34	0.13	0.36	0.13	2.24	0.14
Clinical quality indicators						
ClinicalScore100Points	63.47	10.98	62.19	10.66	1.02	0.31
Clinical QI summary score	6.00	2.48	6.19	2.20	0.44	0.51
Psychosocial	9.11	2.56	9.02	2.73	0.08	0.78
Physical restraints	5.43	2.01	5.25	2.10	0.52	0.47
Continence	6.07	2.13	5.99	2.44	0.09	0.76
Infections	5.20	2.90	4.90	2.76	0.82	0.36
Accident	6.07	2.86	5.95	2.96	0.12	0.73
Nutrition	5.78	2.83	5.33	2.87	1.84	0.18
Pain	6.12	2.40	6.20	2.08	0.09	0.76
Skin care	6.10	3.27	6.17	2.79	0.04	0.84
Psychotropic drugs	5.89	2.19	6.00	2.08	0.17	0.68
Resident quality of life						
QOL summary score	81.21	3.29	81.92	2.95	3.47	0.06
Meaningful activities	79.50	5.04	80.11	4.67	1.12	0.29

Food enjoyment	80.41	6.59	81.29	6.29	1.31	0.25
Environment	90.02	2.68	90.47	2.56	2.08	0.15
Dignity	95.03	2.21	95.19	1.98	0.36	0.55
Autonomy	85.79	3.37	86.31	3.26	1.71	0.19
Relationships	75.62	4.96	76.68	4.82	3.31	0.07
Caregiving	81.91	5.59	83.18	4.57	4.04	0.05
Mood	70.57	3.54	71.29	3.09	3.20	0.07
Family satisfaction						
Satisfaction summary score	75.25	6.24	76.03	5.37	1.21	0.27
Satisfaction with care	78.23	6.01	78.84	5.20	0.78	0.38
Satisfaction with staff	76.81	5.91	77.14	4.99	0.24	0.63
Satisfaction with environment	76.90	7.94	78.22	6.83	2.16	0.14
Satisfaction with food	68.92	5.36	69.70	5.03	1.58	0.21

Table 5-6 (Supplementary) Regression Analyses of Clinical Quality Outcomes on the Types of Culture Change Implementation Controlling for NH Characteristics (n=102)

B (SE)	Clinical QI summary score	Psycho-social	Physical restraints	Continen-ce	Infections
Type of culture change implementation (Ref=high performers)					
Low performer	-0.34	0.22	-0.5	0.03	0.00
	(2.86)	(0.47)	(0.35)	(0.38)	(0.61)
Average performers	-3.81	0.16	-1.49***	-0.48	-0.42
	(1.95)	(0.37)	(0.43)	(0.32)	(0.42)
Geographic location (Ref=Metropolitan)					
Micropolitan	-0.12	0.23	0.00	1.65***	-0.37
	(2.58)	(0.47)	(0.42)	(0.4)	(0.66)
Rural	2.68	0.24	-0.28	1.48***	-1.53**
	(2.37)	(0.34)	(0.53)	(0.33)	(0.5)
For-profit	1.66	0.49	1.69**	0.56	-0.16
	(2.44)	(0.43)	(0.55)	(0.3)	(0.54)
Affiliated with a Chain	-3.24	-0.56	-0.91	-0.67*	-0.86
	(2.07)	(0.4)	(0.46)	(0.3)	(0.44)
Number of active beds	0.00	0.00	-0.01	0.00	0.00
	(0.02)	(0.00)	(0.01)	(0.00)	(0.00)
Occupancy	18.10*	3.01*	4.53	3.95***	1.03
	(8.25)	(1.46)	(2.47)	(1.13)	(2.2)
Staffing					
Licensed practical nurse	-7.00**	-2.47***	-0.97	-2.78***	2.08**
	(2.58)	(0.55)	(0.73)	(0.59)	(0.7)
Certified nursing assistant	-2.36	-0.48	0.33	0.36	-0.95**
	(1.69)	(0.31)	(0.49)	(0.26)	(0.33)
Mental health and social services staff	-5.57	3.50	0.20	2.45	3.36
	(16.67)	(3.64)	(4.77)	(2.49)	(4.35)
Activity staff	13.67	2.57*	0.60	1.98	-0.69
	(7.04)	(1.23)	(2.16)	(1.02)	(1.77)
Proportion of Medicaid resident days	-8.15	0.61	1.89	1.22	0.21
	(5.53)	(0.95)	(1.46)	(0.91)	(1.39)
Intercept	61.40***	4.72*	5.45	1.64	6.58*
	(10.23)	(1.83)	(3.03)	(1.56)	(2.66)
R^2	0.17	0.21	0.17	0.39	0.18

Table 5-6 (Supplementary) Regression Analyses of Clinical Quality Outcomes on The Types of Culture Change Implementation Controlling for NH Characteristics (n=102) (Continued)

B (SE)	Accid-ent	Nutrition	Pain	Skin care	Psycho-tropic drugs	Physical function
Type of culture change implementation (Ref=high performers)						
Low performer	1.35*	-0.75	0.47	-0.44	-0.81	-0.25
	(0.65)	(0.68)	(0.69)	(0.47)	(0.72)	(0.43)
Average performers	0.25	0.05	-0.65	-0.88*	-0.37	-0.58
	(0.52)	(0.51)	(0.51)	(0.37)	(0.54)	(0.34)
Geographic location (Ref=Metropolitan)						
Micropolitan	-0.63	-0.18	-0.04	0.33	0.10	-0.38
	(0.53)	(0.68)	(0.64)	(0.53)	(0.56)	(0.39)
Rural	-0.10	0.85	0.86	0.54	0.37	0.48
	(0.51)	(0.54)	(0.63)	(0.43)	(0.61)	(0.44)
For-profit	-0.56	-0.31	-0.15	-0.9	1.45*	1.09*
	(0.56)	(0.7)	(0.62)	(0.46)	(0.65)	(0.43)
Affiliated with a Chain	-0.25	-0.13	1.04*	0.66	0.09	-1.19**
	(0.47)	(0.51)	(0.47)	(0.36)	(0.55)	(0.37)
Number of active beds	0.01**	-0.01	0.01	-0.01*	0.00	0.01
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Occupancy	5.39*	5.56*	2.6	1.38	4.95*	3.79*
	(2.13)	(2.37)	(1.98)	(1.28)	(2.15)	(1.46)
Staffing						
Licensed practical nurse	1.41	-1.45	-1.52	-0.1	-1.27	-0.53
	(0.75)	(0.94)	(0.8)	(0.62)	(1.09)	(0.53)
Certified nursing assistant	-0.94**	-0.29	-0.18	-0.62*	-0.45	-0.59
	(0.32)	(0.56)	(0.49)	(0.27)	(0.45)	(0.32)
Mental health and social services staff	-9.47**	-7.09	-3.39	0.18	0.76	0.82
	(3.42)	(4.81)	(3.32)	(2.64)	(3.67)	(3.16)
Activity staff	2.38	-2.31	6.27***	3.72**	6.38***	1.84
	(1.42)	(1.92)	(1.5)	(1.38)	(1.83)	(1.3)
Proportion of Medicaid resident days	-1.77	0.91	-1.21	-1.67	-1.98	-0.73
	(1.47)	(1.74)	(1.55)	(1.07)	(1.68)	(1.12)
Intercept	2.12	4.48	3.23	7.10***	2.8	4.58*
	(2.44)	(3.09)	(2.92)	(1.59)	(2.92)	(2.07)
R^2	0.25	0.18	0.17	0.18	0.13	0.21

Table 5-7 (Supplementary) Regression Analyses of Resident Quality Of Life on the Types Of Culture Change Implementation Controlling for NH Characteristics (n=102)

B (SE)	QOL summary score	Meaning-ful activities	Food enjoyment	Environ-ment	Dignity
Type of culture change implementation (Ref=high performers)					
Low performer	-1.45**	-2.34*	-2.20	-1.62**	-1.32***
	(0.51)	(1.03)	(1.17)	(0.56)	(0.32)
Average performers	-1.85***	-2.30***	-3.03***	-1.04**	-1.13***
	(0.35)	(0.65)	(0.8)	(0.39)	(0.24)
Geographic location (Ref=Metropolitan)					
Micropolitan	-0.38	0.00	0.64	-0.03	-0.59*
	(0.37)	(0.67)	(0.83)	(0.43)	(0.3)
Rural	0.48	-0.16	1.48	-0.23	0.25
	(0.4)	(0.74)	(0.96)	(0.56)	(0.27)
For-profit	-0.62	-0.86	-1.66	0.00	-0.16
	(0.52)	(0.85)	(1.05)	(0.59)	(0.28)
Affiliated with a Chain	-0.90*	-0.82	-1.63	-0.5	-0.80*
	(0.44)	(0.76)	(0.84)	(0.46)	(0.31)
Number of active beds	-0.01	0.00	-0.01	0.00	0.00
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
Occupancy	3.68*	2.66	-1.24	3.91	1.27
	(1.69)	(2.8)	(4.46)	(2.39)	(1.29)
Staffing					
Licensed practical nurse	0.32	-1.33	1.14	-0.95	0.57
	(0.64)	(1.09)	(1.54)	(0.79)	(0.42)
Certified nursing assistant	-1.04*	-1.28	-2.62**	-0.18	-0.42
	(0.5)	(0.8)	(0.83)	(0.51)	(0.26)
Mental health and social services staff	3.67	1.67	1.97	-1.03	-0.2
	(3.65)	(6.28)	(7.13)	(4.31)	(2.08)
Activity staff	4.76**	8.80***	10.43***	2.65	1.10
	(1.48)	(2.08)	(2.81)	(1.83)	(1.29)
Proportion of Medicaid resident days	-4.91***	-8.07**	-12.85***	-3.96**	-2.81***
	(1.2)	(2.52)	(2.82)	(1.50)	(0.64)
Intercept	83.94***	85.45***	95.41***	90.09***	97.55***
	(2.34)	(4.3)	(5.59)	(3.05)	(1.54)
R^2	0.37	0.28	0.36	0.19	0.28

Table 5-7 (Supplementary) Regression Analyses of Resident Quality Of Life on the Types Of Culture Change Implementation Controlling for Other Nursing Home Characteristics (n=102) (continued)

B (SE)	Autonomy	Relation-ships	Caregiving	Mood
Type of culture change implementation (Ref=high performers)				
Low performer	-1.52*	-0.45	-1.70	0.17
	(0.62)	(0.82)	(0.86)	(0.61)
Average performers	-2.11***	-2.11***	-2.37***	-0.99
	(0.43)	(0.57)	(0.66)	(0.58)
Geographic location (Ref=Metropolitan)				
Micropolitan	-0.79	0.08	-1.34*	-0.65
	(0.54)	(0.63)	(0.65)	(0.53)
Rural	0.43	0.96	1.19	1.39*
	(0.49)	(0.74)	(0.77)	(0.58)
For-profit	-0.56	-0.78	-1.89*	-1.03
	(0.54)	(0.87)	(0.85)	(0.72)
Affiliated with a Chain	-1.40**	-0.4	-1.61*	-0.58
	(0.5)	(0.69)	(0.76)	(0.61)
Number of active beds	0.00	-0.01	-0.02***	-0.01*
	(0.00)	(0.01)	(0.01)	(0.00)
Occupancy	1.79	5.31*	9.60**	4.45
	(2.21)	(2.63)	(3.34)	(2.4)
Staffing				
Licensed practical nurse	-0.01	-0.84	1.15	1.63
	(0.67)	(0.99)	(1.27)	(0.87)
Certified nursing assistant	-0.4	-1.03	-1.33	-0.91
	(0.45)	(0.62)	(0.7)	(0.55)
Mental health and social services staff	1.6	7.29	9.86	6.08
	(3.78)	(5.52)	(5.56)	(5.6)
Activity staff	0.82	6.66**	5.55	3.12
	(1.82)	(2.32)	(3.15)	(2.17)
Proportion of Medicaid resident days	-2.77*	-2.48	-4.00	-6.20***
	(1.33)	(1.87)	(2.24)	(1.72)
Intercept	88.80***	76.24***	81.05***	71.77***
	(2.83)	(3.76)	(3.73)	(3.36)
R^2	0.24	0.22	0.39	0.26

Table 5-8 (Supplementary) Regression Analyses of Family Satisfaction on the Types of Culture Change Implementation Controlling for NH Characteristics (n=102)

B (SE)	Satisfaction summary score	Satisfaction with care	Satisfaction with staff	Satisfaction with environment	Satisfaction with food
Type of culture change implementation (Ref=high performers)					
Low performer	-2.22	-0.98	-1.00	-3.98**	-2.77*
	(1.23)	(1.2)	(1.26)	(1.44)	(1.21)
Average performers	-1.47	-1.17	-0.75	-2.05*	-1.73*
	(0.86)	(0.85)	(0.82)	(1.00)	(0.81)
Geographic location (Ref=Metropolitan)					
Micropolitan	-1.25	-1.19	-1.45	-2.44*	0.26
	(0.89)	(0.87)	(0.84)	(1.06)	(0.99)
Rural	1.36	1.45	1.00	1.87	1.05
	(0.97)	(0.98)	(0.96)	(1.15)	(0.83)
For-profit	-3.44**	-3.24**	-2.85**	-4.64***	-2.68*
	(1.09)	(1.09)	(1.02)	(1.19)	(1.1)
Affiliated with a Chain	-1.98*	-1.71	-1.89*	-1.95	-2.16*
	(0.88)	(0.87)	(0.85)	(1.03)	(0.83)
Number of active beds	-0.03	-0.02	-0.03	-0.03*	-0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Occupancy	2.33	1.64	2.68	5.53	0.14
	(4.25)	(4.11)	(4.06)	(5.01)	(4.16)
Staffing					
Licensed practical nurse	-0.39	-0.39	-0.73	0.24	-0.65
	(1.19)	(1.19)	(1.09)	(1.39)	(1.35)
Certified nursing assistant	-1.12	-1.05	-0.95	-0.21	-1.81*
	(0.71)	(0.67)	(0.65)	(0.92)	(0.74)
Mental health and social services staff	4.32	3.78	2.48	0.88	9.76
	(9.35)	(9.84)	(9.23)	(9.96)	(8.39)
Activity staff	0.77	1.12	1.19	0.44	0.04
	(2.91)	(2.92)	(2.97)	(3.44)	(2.72)
Proportion of Medicaid resident days	-9.45**	-7.53*	-4.72	-15.32***	-8.69**
	(2.8)	(2.87)	(2.69)	(2.96)	(2.77)
Intercept	86.21***	87.55***	83.85***	87.80***	82.68***
	(5.6)	(5.37)	(5.13)	(6.46)	(5.77)
R^2	0.38	0.3	0.3	0.49	0.37

Chapter 6 The Relationships of Nursing Home Culture Change Practices with Resident Quality of Life and Family Satisfaction: towards a More Nuanced Understanding (Manuscript 3)

Overview

Transforming NHs from restrictive institutions to person-centered homes, often referred to as NH culture change, is a complex process given the number of interacting components and the variability of outcomes. While NH culture change is generally examined as a whole "package," few studies have examined domain-specific relationships between culture change practices and quality outcomes. This study, based on a survey of administrators in Minnesota NHs (n=102), tested the domain-specific relationships of culture change practices with resident quality of life (QOL) and family satisfaction, and examined the moderating effect of small home or household models on these relationships. The findings revealed that culture change in the physical environment, staff empowerment, staff leadership, and end-of-life care was positively associated with at least one specific domain of resident QOL and family satisfaction, with staff empowerment having the most extensive benefits on resident QOL. Implementing small home and household models had a buffering effect on the positive relationships between staff empowerment and the outcomes. The findings provide meaningful implications for designing and implementing NH culture change practices that best benefit residents QOL and improve family satisfaction.

Introduction

Nursing home (NH) culture change is generally viewed as a philosophy and a process that seeks to transform NHs from restrictive institutions to living communities where residents are able to continue their lives according to their preference and with dignity (Mitty, 2005). Culture change in NHs has become a national campaign in the U.S. (Koren, 2010; Zimmerman, Shier, & Saliba, 2014) with about 88% of NHs at least partially engaging in and 16% completely implementing culture change practices (Miller et al., 2018), and it also has gained growing recognition in the NH industry worldwide (Caspar, O'Rourke, & Gutman, 2009; de Rooij, Luijkx, Declercq, & Schols, 2011; Miller et al., 2018; Sjogren, Lindkvist, Sandman, Zingmark, & Edvardsson, 2017).

While NHs can implement culture change through adopting established models such as the Green House Project (Rabig, Thomas, Kane, Cutler, & McAlilly, 2006), some develop their tailored culture change initiatives based on the organization's budget, mission, leadership, workforce, resident case mix, or external policies (Zimmerman et al., 2014). Culture change is intrinsically complex (Sterns, Miller, & Allen, 2010) and typically involves reforms of three major domains: care practices, workplace practices, and the physical environment according to the Holistic Approach to Transformational Change (HATCh) model (Healthcentric Advisors, 2020) and the Nursing Home Integrated Model for Producing and Assessing Cultural Transformation (Hartmann et al., 2013). Culture change in care practices involves prioritizing resident preferences and autonomy, and promoting resident engagement. Culture change in workplace practices embraces staff empowerment, interdisciplinary collaboration, and nonhierarchical management. The environment domain involves modifying the physical environment to create a homelike

atmosphere that promotes independence and privacy, and fosters spontaneity and engagement (Hartmann et al., 2013).

The number of studies examining the effects of culture change practices on a range of clinical quality indicators and organizational outcomes is accumulating. The findings have been inconsistent, although some studies indicated potential benefits (Hill, Kolanowski, Milone-Nuzzo, & Yevchak, 2011; Shier, Khodyakov, Cohen, Zimmerman, & Saliba, 2014). The major reason for such inconsistency is in part due to variations in culture change implementation and difficulties in measuring culture change practices (Hill et al., 2011; Shier et al., 2014). Besides, previous studies examined culture change as a whole "package," and few studies have decomposed the complex culture change into its domains and evaluated domain-sensitive outcomes. Examining domain-specific impacts is essential to better inform the development of outcome-oriented culture change initiatives and to maximize the efficiency and cost-effectiveness of culture change implementation.

Two important outcomes of culture change implementation are resident quality of life (QOL) and family satisfaction, which have not been adequately examined (Duan, Mueller, Yu, & Talley, 2020; Hill et al., 2011; Lepore, Lima, Clark, Gozalo, & Miller, 2019; Shier et al., 2014). Prior studies focused on quality of care indicators derived from clinical data or administrative data (Duan et al., 2020; Hill et al., 2011; Lepore et al., 2019; Shier et al., 2014). Although NH culture change intends to improve resident QOL and family satisfaction, empirical evidence for these effects is still lacking (Duan et al., 2020; Hill et al., 2011; Lepore et al., 2019; Shier et al., 2014). Moreover, since both resident QOL and family satisfaction are multidimensional concepts that include physical, psychological, social and environmental domains (Kane et al., 2003; Shippee, Henning-Smith, Gaugler,

Held, & Kane, 2017), investigating domain-specific relationships of culture change practices with resident QOL and family satisfaction will provide meaningful implications for designing culture change interventions centered on resident and family needs.

Lastly, previous research paid little attention to the moderating effect of architectural renovation on the relationships between culture change practices and quality outcomes. Physical environment transformation is a key component of NH culture change implementation, and has been realized in a variety of forms (Miller et al., 2018). Some NHs may engage in radical changes in architectural structure by building self-contained units or small-scale homes (often referred as small home or household models), while others may only implement small and financially manageable changes in the physical environment (such as eliminating overhead pages and encouraging home-like decorations) (Shield, Tyler, Lepore, Looze, & Miller, 2014). The physical environment has a continuous influence on resident life and activities taking place within it (Noell, 1995). It is worth noting if culture change practices yield different benefits in NHs implementing small home or household models versus NHs maintaining the traditional architectural structure, particularly given that building renovation is not achievable for most NHs (Shield, Tyler, et al., 2014).

To address these knowledge gaps, the first aim of this study was to test the domain-specific relationships of culture change practices with resident QOL and family satisfaction. We hypothesize that a certain domain of culture change practices is significantly associated with at least one resident QOL domain or one family stratification domain. The second aim was to examine the moderating effect of small home or household models on these relationships. We hypothesized the positive relationships between culture change practices

and resident QOL or family satisfaction are more pronounced in small home or household homes than in traditional NHs.

Methods

Sample and Data Sources

This cross-sectional study surveyed NH administrators online about culture change implementation in their facilities in all Medicare-and/or-Medicaid-certified NHs in Minnesota (n=363) between August 2018 and January 2019. Administrative data (i.e., NH characteristics and quality measures), obtained from the Minnesota Department of Human Services, was linked to the survey data. This study was exempt from human subject research by the Institutional Review Board of (blind for review) because no personal questions of respondents were involved in the survey and only facility-level data were used.

Variables and Measures

Culture change practices. The key independent variables are culture change practices which were collected through an online survey. The survey instrument was adapted from a culture change assessment tool developed by researchers at Brown University (Miller et al., 2014). The tool measures six domains of culture change practices including physical environment transformation, staff empowerment, staff leadership, resident-centered care, family and community engagement, and end-of-life care. Table 6-1 demonstrates the survey items of each domain. As suggested by the previous use of the tool (Miller et al., 2018), a composite score was obtained for each domain by summing the raw item scores, and then rescaled to 0-100. The missing value of an item was imputed using the mean of completed items in a given domain if one or two items were missing for that domain. Otherwise, domain scores were reported as incomplete. This instrument has

demonstrated good internal consistency (with omega coefficients being 0.81-0.91 for six domains) (Miller et al., 2018; Tyler et al., 2011). The instrument has satisfactory face and content validity, as it has undergone a rigorous process of item development and scale validation (Miller et al., 2018; Tyler et al., 2011). Cronbach's alpha of each domain based on the current sample ranged from 0.43 for physical environment transformation to 0.79 for family and community engagement.

The moderating variable is the implementation of small home or household models. The culture change survey includes questions asking whether the facility has redesigned or built some sections of their facility into small homes or households that house no more than 8 to 10 or 14 to 20 residents respectively that include kitchens, dining facilities, and common living areas. The answer was coded as 1=implementing small home or household models and 0=not implementing.

Quality outcomes. Facility-level risk-adjusted quality measures on resident QOL and family satisfaction came from publicly available data published in the Minnesota Nursing Home Report Card (Minnesota Department of Health and Human Services, 2019). Resident QOL and family satisfaction are collected through face-to-face interviews or surveys with a random sample of residents or family members in every NH. The Minnesota Department of Human Services contracts with an outside research vendor to complete these standardized interviews and surveys annually.

Both resident QOL and family satisfaction surveys capture multiple domains of the quality outcomes. Table 6-1 shows the outcome measures by domain. The resident QOL survey has eight domains including meaningful activities, food enjoyment, environment, dignity, autonomy, relationships, caregiving, and mood. The family satisfaction survey has

four domains including staff, care, environment, and food. Each resident QOL or family satisfaction domain is measured on a 0-100 scale with higher scores indicating better outcomes. A summary score of resident QOL or family satisfaction for an individual was calculated by taking the average of the domain scores. This study used the risk-adjusted facility-level score for each outcome. A risk-adjusted facility-level quality score is constructed by taking the predicted mean of all interviewed or surveyed individuals in the NH based on linear regression modeling adjusting for facility characteristics and resident or family member characteristics that were generally not a result of provider performance. The resident QOL and family satisfaction instruments have been validated with Cronbach's alpha ranging from 0.53-0.77 across the eight resident QOL domains (Kane et al., 2003), and 0.86-0.96 across the four family satisfaction domains (Shippee et al., 2017).

NH structural and organizational characteristics. Data on NH structural and organizational characteristics were obtained from cost reports submitted by facilities to the Minnesota Department of Human Services. The variables included proprietary status (for-profit, non-profit, government-owned), chain affiliation (yes/no), geographic location (metropolitan, micropolitan, rural), size (number of active beds), occupancy rate (number of occupied beds divided by total number of active beds), payer mix (percentage of resident days paid by Medicaid), staffing (hours of a given type of staff per resident day). Staffing was calculated for registered nurses, licensed practical nurses, certified nursing assistants, trained medication aides, mental health and social work staff, and activity staff.

Table 6-1 Measures of Culture Change Practices, Resident Quality of Life, and Family Satisfaction

Conceptual Domains	Number of Items & Scoring
Culture change practices	
Physical environment transformation	12 items (e.g., private rooms, outdoor spaces, open kitchen and dining, eliminate nurse station and overhead page); 0-100
Staff empowerment	13 items (e.g., self-managed work schedules, cross-training, consistent staff assignment, rewards for extra education); 0-100
Staff leadership	10 items (e.g., certified nurse assistants participating in management activities, in-service education); 0-100
Resident-centered care	9 items (e.g., residents determining their schedules, activities, and care); 0-100
Family and community engagement	9 items (e.g., family and community members participating in care and social activities); 0-100
End-of-life care	6 items (e.g., fulfilling various needs of a terminally ill resident, providing emotional support for family members); 0-100
Resident quality of life	
Meaningful activities	5 items (e.g., enough scheduled and enjoyable activities); 0-100
Food enjoyment	4 items (e.g., enjoying the food, menu changes enough); 0-100
Environment	8 items (e.g., easy to get around, enough privacy, feeling safe); 0-100
Dignity	5 items (e.g., staff listening to residents, treating residents politely); 0-100
Autonomy	4 items (e.g., choosing time to get up, expressing preferences); 0-100
Relationships	4 items (e.g., staff stopping by just to talk); 0-100
Caregiving	9 items (e.g., staff helping in a timely way); 0-100
Mood	9 items (e.g., residents often feeling angry, bored, or happy, relaxed); 0-100
Family satisfaction	
Care	12 items (e.g., include family's opinions in care planning); 0-100
Staff	8 items (e.g., staff knowing residents, staff's attitude); 0-100
Environment	6 items (e.g., smell, cleanliness, safety); 0-100
Food	3 items (e.g., quality of food, atmosphere at meal time); 0-100

Analysis

Descriptive statistics were used to describe NH characteristics, culture change domain scores, resident QOL scores, and family satisfaction scores. ANOVA or Chi-square tests were used to compare sample characteristics of NHs implementing small home or household models versus NHs maintaining the traditional architectural structure. We built a linear regression model separately for the summary scores of resident QOL and family satisfaction, and their domain scores. The independent variable was an individual culture change domain (six culture change domains were introduced separately). We added an interaction between a given culture change domain and small home or household models to each regression model to test the moderating effect of small home or household models. We also adjusted for covariates that were found associated with QOL and satisfaction in prior studies (i.e., number of active beds, activity staff hours per resident day, and proportion of Medicaid resident days) (Shippee, Henning-Smith, Kane, & Lewis, 2015; Shippee, Hong, Henning-Smith, & Kane, 2015). Sampling weights were applied to ANOVA, Chi-square tests, and regression analyses to adjust for proprietary status and geographic location. The Stata syntax poststrata and postweight under the syvset command was used to adjust the sample weights and the population size. All analyses were conducted in Stata 15.0 (StataCorp, 2017).

Our hypothesis is that a certain culture change domain is associated with at least one resident QOL domain or family satisfaction domain. As multiple hypothesis tests were performed to test the effect of a certain culture change domain given multiple outcomes (8 resident QOL domains and 4 family satisfaction domains), the results are subjected to increased family-wise error rate (FWR, the probability of making one or more false

discoveries or type I errors) in terms of the effect of the culture change domain on resident QOL domain or family satisfaction. Therefore, we applied Šidák correction to each test of individual outcome domains to counteract the multiple comparison problem (Abdi, 2007). Given 8 different null hypotheses performed to test the effect of a given culture change domain on resident QOL domains and a familywise alpha level of 0.5, each null hypothesis was rejected that had a p-value lower than $\alpha_{\text{per test of resident QOL domains}} = 1 - (1 - 0.05)^{1/8} = 0.0064$. Likewise, each null hypothesis performed to test the effect of a given culture change domain on family satisfaction domains was rejected that had a p-value lower than $\alpha_{\text{per test of family satisfaction domains}} = 1 - (1 - 0.05)^{1/4} = 0.0127$.

Results

The survey was sent to 363 NH administrators and 102 completed the survey for a response rate of 28.1%. No significant differences in NH characteristics and the quality outcomes were observed between participants and non-participants, except that participating NHs were less likely to be affiliated with a chain and had slightly higher CNA staffing ($p<0.05$). Of the surveyed NHs, 34% (n=35) implemented small home or household models. As displayed in Table 6-2, NHs implementing small home or household models were more likely to be non-profit, have a higher number of active beds, a higher occupancy rate, a lower activity staffing level, and a lower proportion of Medicaid residents ($p<0.05$). They also reported higher culture change scores in the physical environmental transformation and staff empowerment ($p<0.05$). Nursing homes that implemented small home or household models has significantly higher scores on overall resident QOL and

three QOL domains (i.e., environment, autonomy, caregiving), and overall family satisfaction and three satisfaction domains (i.e., care, environment, food) ($p<0.05$).

Table 6-2 A Comparison of Nursing Home (NH) Characteristics, Culture Change Domain Scores, Resident Quality of Life, and Family Satisfaction By Status of NHs that Did and Did Not Implement Small Home or Household Models

	All NHs (n=102)		NHs implementing small home or household models (n=35)		NHs not implementing small home or household models (n=67)		F/Chi[2]
	Mean/ %	SE[a]	Mean/ %	SE[a]	Mean/ %	SE[a]	
Facility characteristics							
For-profit	30.96%		7.57%		41.74%		11.88***
Affiliated with a chain	52.44%		49.18%		53.95%		0.21
Located in metropolitan areas	56.16%		57.73%		55.44%		0.10
Number of active beds	76.93	3.99	89.21	9.11	70.99	4.70	4.74*
Occupancy	0.84	0.01	0.91	0.01	0.81	0.01	54.42***
Staffing (hours per resident day)							
Registered nurses	0.61	0.03	0.70	0.05	0.60	0.05	2.31
Licensed practical nurses	0.74	0.02	0.79	0.07	0.74	0.02	0.17
Certified nursing assistants	2.40	0.04	2.51	0.13	2.40	0.06	0.63
Mental health and social services staff	0.12	0.00	0.14	0.01	0.12	0.01	0.04
Activity staff	0.28	0.01	0.24	0.01	0.31	0.01	7.39**
Proportion of Medicaid resident days	0.54	0.01	0.44	0.04	0.56	0.02	10.92**
Culture change domain scores							
Environment transformation	64.39	1.19	72.54	1.69	60.55	1.46	28.86***
Staff empowerment	37.63	1.49	40.21	2.41	36.43	1.77	4.65*
Staff leadership	39.51	1.45	40.76	2.86	38.92	1.88	1.31
Resident-centered care	68.87	1.60	71.99	1.95	67.93	1.95	2.90
Family and community engagement	27.59	1.66	26.81	3.78	28.25	2.26	0.02
End-of-life care	76.62	2.07	80.23	3.30	76.31	2.41	2.31
Resident quality of life							
Summary score	81.58	0.20	82.34	0.41	81.51	0.24	5.07*
Meaningful activities	79.67	0.32	80.80	0.55	79.59	0.39	3.57
Food enjoyment	81.28	0.42	81.85	1.06	81.33	0.54	1.39
Environment	89.78	0.21	90.81	0.38	89.53	0.26	8.18**
Dignity	95.25	0.13	95.54	0.22	95.27	0.15	1.01
Autonomy	85.76	0.23	86.77	0.34	85.56	0.28	8.56**
Relationships	76.84	0.30	77.03	0.45	76.99	0.38	0.27
Caregiving	82.97	0.33	84.48	0.48	82.91	0.40	7.08*
Mood	71.16	0.25	72.10	0.45	71.17	0.32	1.91
Family satisfaction							
Summary score	75.66	0.42	77.52	0.73	75.51	0.52	8.51**
Care	78.50	0.41	79.74	0.66	78.55	0.50	3.92*
Staff	76.81	0.39	77.64	0.59	77.03	0.50	1.64

Environment	77.71	0.52	81.07	0.96	76.99	0.61	21.17***
Food	69.45	0.40	71.21	0.80	69.25	0.54	7.68**

Note. Sampling weights were applied to the analysis to adjust for geographic locations and profit status. * $p<0.05$, ** $p<0.01$, *** $p<0.001$. a. Linearized standard error.

Table 6-3 presents the regression results for the main effect of each culture change domain on resident QOL. Culture change domains including physical environment transformation, staff empowerment, and staff leadership were significantly associated with the resident QOL summary score ($p<0.05$). Staff empowerment had a significant main effect on five resident QOL domains including meaningful activities, food enjoyment, dignity, autonomy, and caregiving ($p<0.006$). Staff leadership had a significant main effect on three resident QOL domains including meaningful activities, dignity, and autonomy ($p<0.006$). End-of-life care had a significant main effect on meaningful activities ($p<0.006$). We did not add the interaction with small home or household models to the model testing the effect of physical environment transformation because of its collinearity with small home or household models. In the regression model without an interaction term, physical environment transformation was significantly associated with the QOL domain of the environment ($p<0.006$).

Table 6-3 also demonstrates the moderating effect of small home and household models on the relationships between culture change and resident QOL. The moderating effect of small home or household models was statistically significant on the relationships of staff empowerment with resident QOL summary score ($p<0.05$) and with three QOL domains including meaningful activities, autonomy, and caregiving ($p<0.006$). The significant moderating effect was also found on the relationship of staff leadership with resident QOL summary score ($p<0.05$). The coefficients of the moderating effects were less than zero and had an absolute value larger than coefficients of the main effect of a

given culture change domain, indicating resident QOL declined with the increase of the culture change domain score for NHs implementing small home or household models. As an example, one-point increase in the staff empowerment score resulted in an increase in the QOL summary score of 0.05 (staff empowerment + staff empowerment × small home or household models = 0.05×1 + (-0.08) ×1×0= 0.05) for NHs not implementing small home or household models. However, in NHs implementing small home or household models, one-point increase in staff empowerment score resulted in a decrease in the QOL summary score of 0.03 (staff empowerment + staff empowerment × small home or household models = 0.05×1 + (-0.08) ×1×1= -0.03). Figure 6-1 illustrates margins of the outcomes predicted by a given culture change domain at the means of covariates by NHs with or without the implementation of small home or household models for regression models with a statistically significant interaction term.

Table 6-4 presents the regression results for the main effect of each culture change domain on family satisfaction. Only one culture change domain—end-of-life care—was significantly associated with the family satisfaction summary score ($p<0.05$). Three culture change domains, including staff empowerment, staff leadership, and end-of-life care, had a significant main effect on family satisfaction with food ($p<0.013$). Physical environment transformation was significantly associated with the family satisfaction domain of the environment ($p<0.013$).

Table 6-4 also shows the moderating effect of small home and household models on the relationships between culture change and family satisfaction. The significant moderating effect of small home or household models was only found on the relationship between staff empowerment and family satisfaction with food ($p<0.013$). One-point

increase in the staff empowerment score resulted in an increase of 0.09 in the domain of food satisfaction for NHs not implementing small home or household models, but a decrease of 0.06 for NHs implementing small home or household models.

Table 6-3 Associations between Culture Change Domains and Resident Quality of Life and the Moderating Effect of Small Home/Household Models

Independent variables	QOL Summary score	Resident QOL domain scores[a]							
		Meaningful activities	Food enjoyment	Environ-ment	Dignity	Autonomy	Relation-ships	Care-giving	Mood
Environment transformation	**0.031***	0.02	0.04	0.03*	0.02*	**0.06***‡	0.02	0.03	-0.02
R^2	0.16	0.14	0.20	0.11	0.11	0.13	0.06	0.10	0.11
Staff empowerment	**0.05****	**0.09***‡	**0.08**‡	0.04*	**0.04***‡	**0.06***‡	0.03	**0.09**‡	0.01
Interaction with small home/household models	**-0.08****	**-0.11**‡	-0.06	-0.05	-0.05*	**-0.10***‡	-0.04	**-0.15***‡	-0.06
R^2	0.24	0.23	0.25	0.13	0.16	0.18	0.08	0.22	0.15
Staff leadership	**0.04****	**0.07***‡	0.07*	0.02	**0.03**‡	**0.05**‡	0.03	0.05	0.00
Interaction with small home /household models	**-0.05***	-0.08*	-0.05	-0.03	-0.04	-0.06*	-0.07	-0.10*	-0.05
R^2	0.20	0.20	0.25	0.11	0.12	0.13	0.08	0.17	0.15
Resident-centered care	0.01	0.00	0.02	0.02	0.01	0.03*	-0.02	0.03	-0.01
Interaction with small home /household models	0.03	0.05	0.09	-0.03	0.00	0.00	0.09*	0.05	0.03
R^2	0.18	0.16	0.24	0.11	0.10	0.11	0.08	0.16	0.14
Family and community engagement	0.02	0.04*	0.05**	0.00	0.01	0.02	0.01	0.01	-0.02
Interaction with small home /household models	-0.01	0.00	-0.08*	0.00	0.00	-0.02	-0.01	-0.01	0.08**
R^2	0.13	0.14	0.21	0.05	0.07	0.07	0.07	0.13	0.14
End-of-life care	0.02	**0.04***‡	0.01	0.01	0.01	0.00	0.03	0.02	0.00
Interaction with small home /household models	-0.01	-0.01	0.00	0.00	-0.01	-0.01	-0.03	-0.02	0.03
R^2	0.14	0.16	0.18	0.07	0.07	0.06	0.08	0.13	0.12

Notes: Each outcome was regressed on an individual culture change domain (six regression models were built for each outcome). The interaction between a given culture change domain and small home or household models was added to all models expect for the model including environment transformation as an independent variable because of its collinearity with small home or household models. Other covariates include the number of active beds, activity staff hours per resident day, and the proportion of Medicaid resident days. Coefficients of covariates were omitted. QOL=quality of life

a: Given 8 different null hypotheses performed to test the effect of a certain culture change domain and a familywise alpha level of 0.5, each null hypotheses was rejected that had a p-value lower than $\alpha_{\text{per test of resident QOL domains}} = 1 - (1 - 0.05)^{1/8} = 0.0064$.

* $p<0.05$, ** $p<0.01$, *** $p<0.001$, ǂ $p<$corrected $\alpha = \alpha_{\text{per test of resident QOL domains}} = 0.0064$.

Table 6-4 Associations between Culture Change Domains and Family Satisfaction and the Moderating Effect of Small Home/Household Models

Independent variables	Family satisfaction Summary score	Family satisfaction domain scores			
		Care	Staff	Environ-ment	Food
Environment transformation	0.05	0.02	0.02	**0.11****ǂ	0.067*
R^2	0.18	0.12	0.12	0.27	0.19
Staff empowerment	0.07	0.04	0.05	0.110*	**0.09***ǂ
Interaction with small home /household models	-0.16**	-0.15*	-0.14*	-0.20**ǂ	**-0.15****ǂ
R^2	0.26	0.19	0.18	0.35	0.26
Staff leadership	0.04	0.01	0.01	0.06	**0.08****ǂ
Interaction with small home /household models	-0.04	-0.02	-0.03	-0.06	-0.05
R^2	0.22	0.15	0.14	0.31	0.25
Resident-centered care	0.05	0.03	0.03	0.08	0.06*
Interaction with small home /household models	-0.05	-0.03	-0.04	-0.09	-0.02
R^2	0.23	0.15	0.14	0.32	0.23
Family and community engagement	0.03	0.02	0.02	0.03	0.03
Interaction with small home /household models	-0.07	-0.06	-0.05	-0.07	-0.10*
R^2	0.19	0.14	0.13	0.28	0.20
End-of-life care	**0.05***	0.04	0.04	0.06*	**0.05***ǂ
Interaction with small home/household models	-0.06	-0.05	-0.07	-0.04	-0.06
R^2	0.21	0.15	0.14	0.29	0.21

Notes: Each outcome was regressed on an individual culture change domain (six regression models were built for each outcome). The interaction between a given culture change domain and small home or household models was added to all model expect for the model including environment transformation as an independent variable because of its collinearity with small home or household models. Other covariates include the number of active beds, activity staff hours per resident day, and the proportion of Medicaid resident days. Coefficients of covariates were omitted.

a: Given 4 different null hypotheses performed to test the effect of a certain culture change domain and a familywise alpha level of 0.5, each null hypotheses was rejected that had a p-value lower than $\alpha_{\text{per test of family satisfaction domains}} = 1 - (1 - 0.05)^{1/4} = 0.0127$.

* $p<0.05$, **$p<0.01$, ***$p<0.001$, ǂ $p<$corrected $\alpha = \alpha_{\text{per test of resident QOL domains}} = 0.0127$.

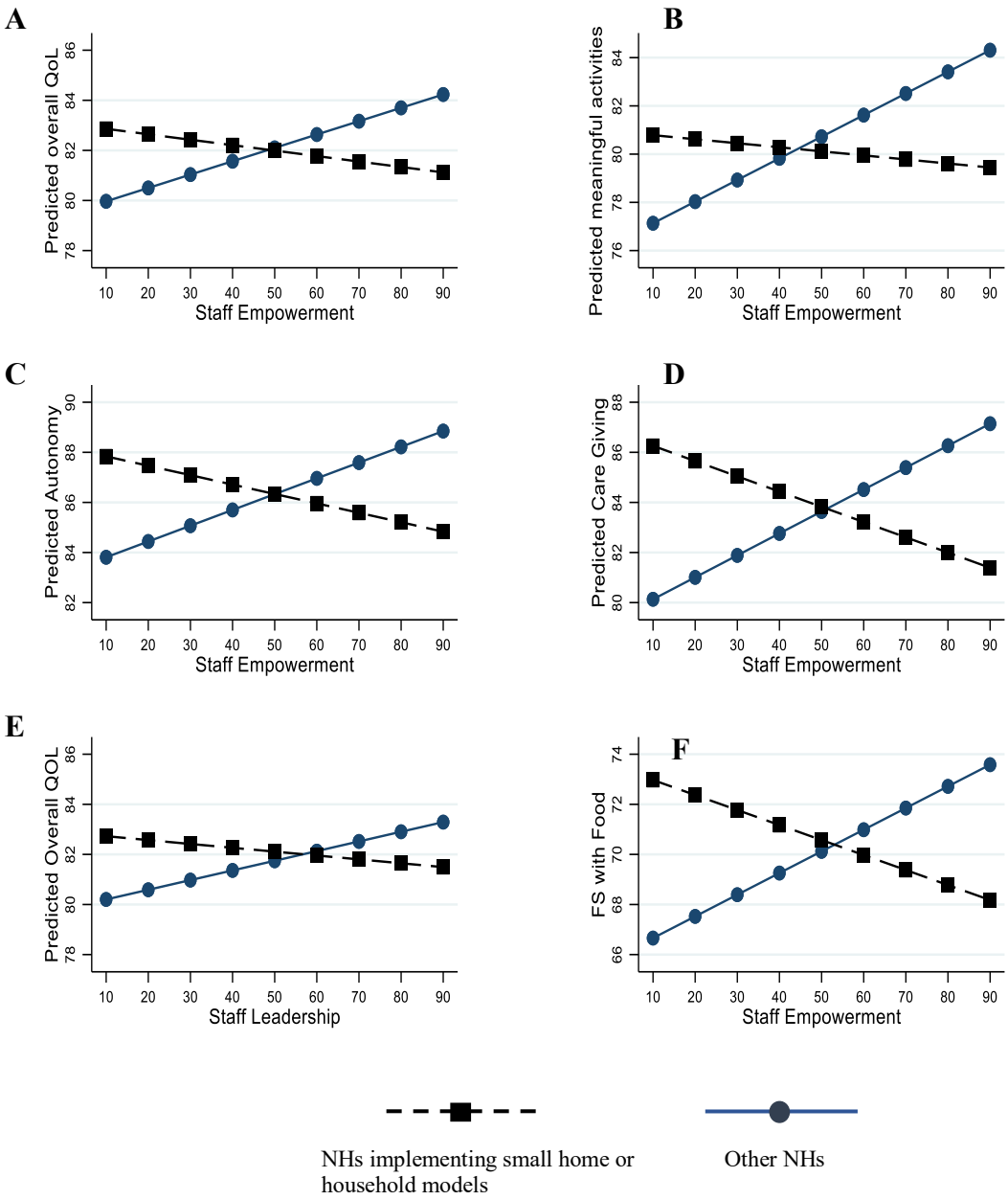

Figure 6-1 Margins Of Resident QOL Scores and Family Satisfaction by NHs With or Without the Implementation of Small Home or Household models

Discussions

Overall, this study revealed that four out of six domains of culture change practices, including physical environment transformation, staff empowerment, staff leadership, and end-of-life care were positively associated with at least one specific domain of resident QOL and family satisfaction. Staff empowerment had the most extensive benefits on resident QOL as it was significantly associated with five out of eight resident QOL domains. Implementing small home and household models moderated the effects of staff empowerment on resident QOL and family satisfaction, yet the direction of the moderating effect was opposite to our hypothesis.

The Domain-Specific Relationships between Culture Change Practices and Resident QOl/Family Satisfaction

Our study revealed that staff empowerment had the most extensive benefits on resident QOL, ranging from promoting residents' positive experience with meal services and day-to-day care, to improving psychosocial well-being (specifically dignity, autonomy, and meaningful activities). Fostering leadership of direct care staff showed a favorable impact on three QOL domains including dignity, autonomy, and meaningful activities. As posited in Kanter's theory of structural empowerment (Kanter, 1987), empowering staff relates to providing access to two aspects of organizational structures: power structures (i.e., access to resources, information, and support) and opportunity structures (i.e., advancement in the organization and professional growth). In our survey, the staff empowerment domain measures empowerment in power structures, such as direct care staff's autonomy toward care activities, self-managed work schedules, and collaborative work, while the staff leadership domains measures empowerment in opportunity structures

such as formal opportunities for direct care staff to participate in management activities and professional development activities.

Our findings regarding the positive relationships between a variety of empowerment strategies (including empowerment on both power structures and opportunity structures) and resident QOL are consistent with prior studies. For example, Barry, Brannon, and Mor (2005) indicated that more autonomy over resident care given to nurse assistants was associated with a higher level of social engagement for residents. Empowering nursing staff was associated with family-reported service quality (Hamann, 2014) and the staff's commitment to providing individualized care (Caspar & O'Rourke, 2008). However, prior studies did not address resident-reported QOL as an outcome of empowering strategies. Some studies provided mechanism-based explanations regarding how staff empowerment influences the care process and care outcomes. Using contingency theory, Zinn, Brannon, Mor, and Barry (2003) related the value of staff empowerment to the care structure in NH settings. They explained that NH care involves a considerable amount of psychosocial care that is organically structured as opposed to mechanistically-structured physical care. A less centralized management structure and a less standardized care process are particularly important for providing psychosocial care. Anderson, Issel, and McDaniel (2003) also indicated that a working environment with more autonomy may facilitate the information flow among people and the diversity of cognitive schema, which in turn leads to improved quality.

The finding of particular interest is the positive association between resident-and-family-centered end-of-life care and perceived meaningful activities. Death is common in NHs, as one in five of all U.S. deaths and 43 percent of deaths for individuals over the age

of 85 occurred in NHs (Wetle, Teno, Shield, Welch, & Miller, 2004). High-quality end-of-life care has been gaining importance in long-term care settings (Miller et al., 2018), and it involves various strategic care solutions related to symptom management, pain management, advanced care planning, and palliative/hospice care (Miller & Han, 2008). Although we did not examine these specific care strategies, our finding suggested that person-centered values embedded in end-of-life care that honors various needs of terminally ill residents and their family members/friends are crucial for general residents living in the NH to perceive a meaningful life. The finding is supported by prior studies that suggest care culture and value towards end-of-life care is important for the residents, the family, staff, and other residents in NHs (Forbes-Thompson & Gessert, 2005; Wallace, Adorno, & Stewart, 2018).

The positive relationship between physical environment transformation and residents' perception of autonomy is another finding worthy of noting. Regardless of architectural renovations such as redesigning or building some sections of the facility into small homes or households, some financially manageable actions of eliminating institutional features of the NHs (e.g., removing nurse station and overhead paging, building accessible indoor/outdoor play areas, displaying personal items in common areas, home-like decoration) has shown beneficial effects on resident QOL (Chaudhury, Cooke, Cowie, & Razaghi, 2018; Day, Carreon, & Stump, 2000). These environmental transformations are generally thought to enhance residents' experience with the physical aspect of the living environment such as comfort, convenience, safety, and privacy. Our findings further indicated that a non-institutional and homelike environment also had some psychosocial impact as they enhance residents' perception of autonomy. Prior studies

provided a potential explanation for this as they pointed out that a more homelike environment helps engage residents in daily activities and social interaction (Campo & Chaudhury, 2012; Milke, Beck, Danes, & Leask, 2009; Morgan-Brown, Newton, & Ormerod, 2013; Smit, de Lange, Willemse, & Pot, 2012).

Our study also examined multiple domains of family satisfaction that may be associated with culture change practices, considering family members can also provide unique and valuable perspectives regarding the quality of NH care. Three culture change domains, including staff empowerment, staff leadership, and end-of-life care, were positively associated with family satisfaction with food, and physical environment transformation was associated with family satisfaction with the environment. We found no significant relationships of family satisfaction domains of caregiving and staff with any domains of culture change practices. While family members can directly perceive culture change in the areas of the physical environment, food services and daily routine care without deep involvement and are readily satisfied with those overt aspects of services, satisfaction with caregiving and the relationship with staff will require deeper interaction and engagement from both the family members and care providers. (Gladstone, Dupuis, & Wexler, 2006; Zimmerman et al., 2012).

The Moderating Role of Small Home or Household models

Promoting staff empowerment largely contributed to improved outcomes (i.e., meaningful activities, dignity, autonomy, caregiving, and family satisfaction with food) for NHs maintaining the traditional architectural structure, but it resulted in declined outcomes for NHs implementing small home or household models. There may be several possible explanations. First, a ceiling effect could occur where culture change initiatives in staff

empowerment and staff leadership lead to fewer gains in improving resident QOL and family satisfaction when the architectural remodeling itself has contributed to improved outcomes for the most part. For NHs without building renovations, there may be more opportunities for empowerment strategies to work on improving quality outcomes.

The second explanation for the buffering effect of small home and household models on the relationships of staff empowerment and quality outcomes may be due to potential challenges in effectively implementing staff empowerment strategies in small home or household homes. Previous studies indicated NHs implementing small home or household models strived to fit in staff to both the physical renovations and the accompanying organizational restructuring (Bowers & Nolet, 2011; Shield, Looze, Tyler, Lepore, & Miller, 2014). As noted by certified nurse assistant in the Green House homes, working in a small-scale home requires a wide range of new skills such as sophisticated interpersonal abilities, time-management skills, and ability to manage complexity, skills that most of them had not developed before transitioning to the new model (Bowers & Nolet, 2011). Consequently, challenges to adapt to the new care model might negatively influence the provision of high-quality care. Finally, the small sample size of small homes or households could result in insufficient statistical power to detect true relationships between culture change practices and quality outcomes for this group of NHs.

Implications for Practice

The findings from the present study provide some practical implications for designing and implementing NH culture change practices that best benefit residents QOL and improve family satisfaction. Given the extensive impact on improving resident QOL, culture change in workplace practices that promoting staff empowerment and fostering

staff leadership should be emphasized and prioritized in culture change implementation, especially for NHs that are incapable of remodeling the architectural structure. Although building small homes or households may not be feasible for all NHs, the beneficial effects of minor and manageable physical environment transformation on resident psychosocial well-being further support NHs' efforts and strategic plans on eliminating the institutional features of the NH environment and creating a home-like atmosphere. Resident-and-family-centered values embedded in day-to-day care should also be extended to end-of-life care, an indispensable aspect of NH care, to enhance residents' perception of living a purposeful and meaningful life. Moving beyond fulfilling those essential needs such as food enjoyment, satisfaction with the environment, and autonomy, NHs should continue to explore culture change initiatives that address comprehensive psychosocial needs of both residents and family members. Those initiatives may need to work towards fostering meaningful interpersonal relationships among residents, family, and staff, and nurturing personal growth.

Limitations and Directions for Future Research

Some limitations of this study should be noted. First, the small sample size did not allow an investigation on the complex interplay among various culture change domains in affecting quality outcomes using structural equation modeling. Future studies with a larger sample size should focus on testing potential mediating or moderating effects of some culture change domains. Empirical findings from such a comprehensive examination will help build the theoretical base of NH culture change, an area of research that is still underdeveloped. Second, the use of facility-level quality outcomes in our study may be subject to aggregation bias. An examination at the individual level may be useful to gain a

more nuanced understanding about the effects of culture change practices on individual residents and staff. The cross-sectional data did not allow us to establish the causal relationships among culture change practices and quality outcomes. Nor can we examine the sustainability of culture change effects. Future studies should work towards these directions by analyzing longitudinal data. The findings of this study, based on data from one state, cannot be generalized to all U.S. NHs. Nonetheless, Minnesota is useful for this study because it provides unique data of resident QOL and family satisfaction that is not available at the national level. Despite a low response rate, negligible nonresponse bias in NH characteristics and the application of weight adjustment may increase the generalizability of the findings to all NHs in Minnesota. Furthermore, qualitative research that employs triangulation strategies in data collection and data analysis is imperative to develop a comprehensive understanding of the effects of culture change practices on various outcomes.

Conclusions

This study examined the domain-specific relationships of culture change domains with resident QOL and family satisfaction. The findings revealed that culture change practices in the physical environment, staff empowerment, staff leadership, and end-of-life care were positively associated with at least one specific domain of resident QOL and family satisfaction, with staff empowerment having the most extensive benefits on resident QOL. Implementing small home and household models had a buffering effect on the positive relationships between staff empowerment and the outcomes. The findings provided meaningful implications for designing and implementing NH culture change practices that best benefit residents QOL and improve family satisfaction.

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Chapter 7 Conclusions

Grounded in perspectives of complexity theory, the Diffusion-of-Innovation theory, and the Social Production Function theory, this study sought to understand how NH culture change practices affect resident QOL. This study systematically examined effects of culture change practices on resident QOL based on multidimensional measures of culture change practices and resident QOL. In this study, culture change practices were examined both as a whole "package" and as interacting components. In addition to resident QOL, family satisfaction and clinical QIs were studied as secondary outcomes to understand the whole range of effects of various culture change practices. Overall, this study revealed positive relationships between NH culture change and resident QOL, regardless of whether multiple domains of culture change practice were examined individually or collectively.

Compared to the 2016/2017 national survey (Miller et al., 2018), the extent to which culture change practices were implemented in Minnesota NHs was comparable to that of a national representative sample of NHs in culture change domains including resident-centered care, staff empowerment, staff leadership, and family and community engagement (Appendix I). However, culture change practices in the physical environment and end-of-life care domains were more frequently implemented in NHs in Minnesota than in NHs nationwide. Consistent with the national survey results, culture change practices associated with resident-centered care, physical environment transformation, and end-of-life care were more frequently implemented than practices associated with staff empowerment, staff leadership, and family and community engagement.

This study generated an empirical typology of culture change implementation that differentiated NHs in Minnesota with respect to levels and patterns of culture change

implementation (which are referred to as high performers, average performers, and low performers). The findings indicated that not all NHs achieved the same level of success in culture change, supporting theoretical expectations of the Diffusion of Innovation theory regarding the progressive and evolving feature of implementing culture change innovations in NHs (Rogers, 2010). Specifically, high performers, accounting for nearly one-third of NHs, appeared the most comprehensive in adopting all culture change domains, and they were particularly distinguished from others by their excellent performance in family and community engagement. Conversely, low performers, accounting for 14% of the NHs, reported the lowest scores in all culture change domains, and they particularly lagged behind others in family and community engagement and end-of-life care. Low performers also had a higher proportion of Medicaid resident days and a lower proportion of private-pay resident days. These findings provided meaningful implications as to allocating appropriate resources to help NHs at different levels of implementation to achieve comprehensive culture change.

Furthermore, this study revealed that the empirical typology was significantly associated with overall QOL and multiple aspects of QOL for NH residents. High performing NHs consistently reported better outcomes in seven (out of eight) resident QOL domains and two (out of four) family satisfaction domains, as compared to average performers and/or low performers. High performers demonstrated the most comprehensive culture change implementation and they even gained some momentum in culture change practices that appeared challenging for average performers and low performers. This finding suggested that average and low performing NHs should advance their culture change implementation, which should involve not only structural and procedural changes

but also embedding a person-centered value into staff's care philosophy and routinizing it into daily practices to improve resident QOL.

The little consistent evidence for the positive relationship between the empirical typology of culture change implementation and clinical QIs suggests that NH culture change did not necessarily focus on a given clinical outcome or a certain dimension of care but on the holistic well-being of residents. Reflecting what was assumed based on the Social Production Function theory (Ormel et al., 1999; Ormel et al., 1997), culture change practices were promising with respect to improving resident QOL, as they were committed to providing a homelike environment, normalizing resident daily life routines, honoring resident preferences, and nurturing caring relationships, which mitigated residents' loss of physical and psychosocial resources they used to possess to maintain optimal QOL.

With the notion that NH culture change is inherently a complex intervention, this study conducted an in-depth examination of the domain-specific relationships of culture change practices with resident QOL/family satisfaction and the moderating effect of small home or household models on these relationships. Overall, this study revealed that four out of six domains of culture change practices were positively associated with at least one specific domain of resident QOL and family satisfaction. Staff empowerment and staff leadership affected resident QOL to a larger extent: the effects ranged from promoting residents' positive experience with meal services and day-to-day care to improving psychosocial well-being (specifically dignity, autonomy, and meaningful activities). While end-of-life care was positively associated with residents' perception of meaningful activities, physical environment transformation was associated with enhanced autonomy for residents. These findings provide practical implications for NH providers with regard

to developing a tailored culture change intervention and prioritizing culture change practices that best meet the needs of residents, family members, and staff.

This study found that the positive relationships between staff empowerment and resident QOL/family satisfaction were more pronounced in NHs maintaining the traditional architectural structure than those implementing small home or household models. This was both an interesting and unexpected finding, and it raised awareness of potential challenges on integrating physical renovations and organizational change into a culture change endeavor. It remains important for future research to further examine the interplay among different domains of culture change practices.

Understanding NH culture change based on perspectives of complexity theory was theoretically, practically, and methodologically important. Suggested by the study findings, the complexity of NH culture change resided in multidimensionality, non-linearity, and connectivity. Nursing home culture change was multidimensional as it involved a number of components and contributed to a variety of outcomes. The notion of non-linearity and connectivity suggested that the effect of NH culture change was not attributed to simple linear pathways nor additive effects of individual components. Indeed, high performing NHs as identified by the empirical typology method demonstrating remarkably better outcomes in resident QOL and family satisfaction made it reasonable to assert that different domains of culture change had synergistic effects and the effect of culture change as a whole "package" might be larger than the sum of effects of individual domains. The in-depth investigation of domain-specific relationships between culture change practices revealed the unique roles of individual culture change domains in affecting resident QOL and family satisfaction.

Implications for Practice

This study provided important implications for NH providers, policymakers, and advocates with respect to developing and advancing NH culture change that best benefits resident QOL and improves family satisfaction. First, the empirical typology of culture change implementation guided resource allocation and the development of tailored culture change initiatives for NHs at different levels of implementation. For example, low and average performing NHs particularly needed supports (finance, policies, or expertise) to promote family/community engagement and resident-and-family-centered end-of-life care. Culture change implementation in low and average performing NHs should emphasize changes in care philosophy besides changes in physical and operational aspects of care. The positive relationships between NH culture change as a whole "package" and quality outcomes (particularly QOL and satisfaction outcomes) supported actions of policymakers, care providers and advocates to promote culture change extensively within or across NHs that covers a broader spectrum of care practices, workplace practices, and the physical environment.

Moreover, the more nuanced examination of domain-specific relationships of culture change practices with resident QOL/family satisfaction informed the development of outcome-oriented culture change initiatives targeting the needs of residents that are pressing. The extensive influence of staff empowerment/leadership on resident QOL suggested culture change in workplace practices should be emphasized and prioritized in culture change implementation, especially for NHs incapable of remodeling the architectural structure. Although building small homes or households might not be feasible for all NHs, the beneficial effects of minor and manageable physical environment

transformation on resident psychosocial well-being further support NHs' efforts and strategic plans on eliminating the institutional features of the NH environment and creating a home-like atmosphere. Resident-and-family-centered values embedded in day-to-day care should also be extended to end-of-life care, an indispensable aspect of NH care, to enhance residents' perception of living a purposeful and meaningful life. Moving beyond fulfilling those essential needs such as food enjoyment, satisfaction with the environment, and autonomy, NHs should continue to explore culture change initiatives that address the comprehensive psychosocial needs of both residents and family members. Those initiatives may need to work towards fostering meaningful interpersonal relationships among residents, family and staff, and nurturing personal growth.

Limitations and Directions for Future Research

Some limitations of this study deserve attention and should be addressed in future research. First, due to the non-experimental design, the relationships between NH culture change and quality outcomes could not be inferred as causal effects. Given practical difficulties in conducting randomized controlled trials or other types of experimental research in NH settings, well-designed non-experimental research such as longitudinal research is necessary. Despite a cross-sectional design, this study had addressed potential threats to internal validity. Nonresponse bias was one source of bias due to a low response rate, despite efforts made to increase the response rate. However, a set of bivariate analysis was done to examine the association between nonresponding and a range of NHs characteristics including structural and organizational characteristics, facility quality outcomes in clinical QIs, resident QOL, and family satisfaction. No significant differences in these variables were observed between participants and non-participants, except that

participating NHs were less likely to be affiliated with a chain and had slightly higher CNA staffing. Given that neither chain affiliation nor CNA staffing has been found significant predictors of resident QOL (Shippee, Henning-Smith, et al., 2015), the influence of non-response bias might be minor. Another potential bias due to cross-section design was confounding factors. This study provided confounder-adjusted estimates for the relationships of NH culture change and quality outcomes. Confounding factors were adjusted for in all regression analyses.

Second, there were some concerns regarding statistical conclusion validity. The small sample size might somewhat reduce statistical power to detect the significant relationships between NH culture change and quality outcomes. However, the results of this study showed considerable effect sizes of NH culture change (both of the typology and individual domains) on facility-level QOL and family satisfaction, which might contribute to increased power. In addition, this study used post-strata sample weight adjustment which contributed to smaller variance estimates and increased power. However, this study was likely subject to false positive errors given the multiple comparison issue. Increased family-wise error rate might occur because repeated tests were performed for the hypothesis that a certain culture change domain was associated with at least one resident QOL/family satisfaction domain. As a solution, this study applied Šidák correction to counteract the multiple comparison problem. In addition, using aggregated data of outcomes variables might cause aggregation bias. The results based on facility-level analyses could not be inferred to individual residents.

Another limitation of this study might result from potential measurement errors. Surveying NH administrators likely introduced social desirability bias, although previous

studies had found NH administrators were more credible than directors of nursing when answering survey questions related to culture change (Shield, Tyler, Berridge, Clark, & Miller, 2018). Despite this limitation, reliable and valid measures of both QOL and culture change practices applied by the study ensured the validity and integrity of the data. Finally, the generalizability of this study was limited to Minnesota NHs. Despite a low response rate, negligible nonresponse bias in regard to NH characteristics and the application of weight adjustment ensured the representativeness of the sample and the generalizability of the findings to all NHs in Minnesota. Yet, the findings could not be generalized to all U.S. NH.

Future research can build on the findings of this study to generate sound evidence for cause-effect relationships between NH culture change and resident QOL. Wherever possible, an experimental design with randomization should be considered because it is the most robust method of preventing selection bias and inferring causal effects. When experimental methods are not feasible, a longitudinal study with concurrent comparison groups and repeated measures of both culture change practices and outcome variables should be applied. In addition to causal effects, examining the sustainability of culture change effects should be highlighted in future research. No matter what non-experimental design is used, rigorous statistical analysis and estimation methods are crucial to compensate for potential selection bias caused by a lack of randomization. Examples of analytic strategies include propensity score matching and instrumental variable estimation.

Furthermore, future research should focus on building theoretical foundation for NH culture change, an area of research that is still underdeveloped. An in-depth investigation of the complex interplay among various culture change domains in affecting

quality outcomes is needed to enhance theoretical understanding of NH culture change. Future research may need to apply more sophisticated statistical modeling such as mediating or moderating analysis and structural equation modeling to study the complexities involved in NH culture change. In addition, an examination at the individual level may be useful to gain a more nuanced understanding of the effects of culture change practices on individual residents and staff. In this regard, direct care staff and staff from multiple departments should be included in data collection of culture change practices. Besides quantitative methods, qualitative research that employs triangulation methods in data collection and data analysis is imperative to develop a comprehensive understanding of the effects of culture change practices on various outcomes.

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Appendices

Appendix A Nursing Home Culture Change Survey

Welcome to ***the Nursing Home Culture Change Survey***

The purpose of this survey is to examine the implementation of culture change practices across Minnesota nursing homes, and to investigate its role in improving residents' quality of life.

This survey will take 15-20 minutes to complete. Your participation is voluntary, and your responses will be kept confidential. Please note that completing the survey indicates you are providing consent to participate.

Thank you for your participation!

Notes: The survey is adapted from a culture change assessment tool developed by researchers in Brown Center for Gerontology & Health Care Research. Click here to obtain the original tool.

The first questions will help us to understand the services your organization provides at your location.

1. Please indicate if your facility has each of the following. Please select "Will implement within 2 years" if plans have been approved or money is obligated. *(Please select <u>one</u> response in each row)*

	Yes	No	Will implement within 2 years
a. A specific unit where subacute or rehab care is provided	○	○	○
b. Long-term care beds	○	○	○
c. Independent living residences	○	○	○
d. Assisted living residences	○	○	○
e. A memory care unit for long-stay residents	○	○	○
f. A memory care unit for assisted living residents	○	○	○
g. Its own palliative care consulting program staffed by nurse and physician palliative care specialists	○	○	○

The next section will ask you about the physical environment of your facility.

Please answer the questions based on the situation for your facility's **long-stay skilled residents.** Do not consider your short-stay, independent or assisted living residents.

2. What percent of your residents has a private room?

- ○ 0%
- ○ 1-4%
- ○ 5-25%
- ○ 26-75%
- ○ 76-100%

3. Do any of your rooms have a bathroom (that is, a toilet and sink) that is shared by 3 or more residents?

- ○ Yes (Please continue with Question 4 & 5)
- ○ No (Please go to Question 6)

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4. What percent of rooms has a bathroom (that is a toilet and sink) shared by 3 or more residents?

- ○ 1-4%
- ○ 5-25%
- ○ 26-50%
- ○ 51-75%
- ○ 76-100%

5. Is your facility working to reduce the number of rooms with bathrooms shared by 3 or more residents?

○ Yes

○ No

In order to make a facility less like an institution and more like a home, some facilities have redesigned some sections of their facilities into **Households** of no more than 14 to 20 residents that include kitchens, dining facilities, and common living areas.

6. Do any of your residents live in **Households** that include kitchen and dining facilities?

○ Yes (Please continue with Question 7)

○ No (Please go to Question 8)

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7. What percent of your residents lives in **Households?**

○ 1-4%

○ 5-25%

○ 26-75%

○ 76-100%

Some facilities provide care within **Small Homes** of no more than 8 to 10 people (such as Green Houses) that include private bedrooms, kitchens, dining rooms and common living areas. Small Homes are often detached from a traditional facility but may also be integrated into a more traditionally-designed facility.

8. Do any of your residents live in **Small Homes** that include private bedrooms, kitchens, dining rooms, and common living areas?

○ Yes (Please continue with Question 9)

○ No (Please go to Question 10)

9. What percent of your residents lives in **Small Homes**?

- ○ 1-4%
- ○ 5-25%
- ○ 26-75%
- ○ 76-100%

10. We are interested in knowing if your facility is planning to open Small Homes. By planning to open, we mean the plans are approved or money is obligated and implementation is expected within 2 years.

- ○ Yes
- ○ No

11. Please indicate if each of the following statements applies to your facility. *(Please select <u>one</u> response in each row)*

	Yes	No	We are working on this
a. The lighting, furniture, and overall environment in residents' living areas are similar to what we would use in our own homes	○	○	○
b. We have indoor and/or outdoor play areas for children	○	○	○
c. Residents who are mobile (with or without assistive devices) can come and go freely in our facility's outdoor spaces	○	○	○
d. We have eliminated nursing stations	○	○	○
e. We have kitchen areas that are accessible to residents and families 24/7	○	○	○
f. We use open dining where a meal is available for at least a two hour period during which residents can choose when to eat	○	○	○
g. All residents can keep their doors closed or open, as they prefer	○	○	○
h. We provide or coordinate free transportation for individual residents to go out for non-medical reasons, such as to local stores of their choice or social visits to friends or family	○	○	○
i. We display residents' personal items, such as family photos, in common living areas outside of their rooms	○	○	○
j. We have a communication system in place that we use as an alternative to overhead paging	○	○	○
k. Noise at night is reduced	○	○	○

The next section will ask you about staff empowerment and staff leadership of your facility.

Please answer the questions based on the situation for your facility's **long-stay skilled residents.** Do not consider your short-stay, independent or assisted living residents.

12. For this question, **staff** refers to all non-management employees of the facility in all departments.

    Please indicate how often your staff does each of the following. *(Please select one response in each row).*

	Never	Sometimes	Often	Always	Not applicable
a. Does staff work together to cover shifts when someone can't come to work?	○	○	○	○	○
b. Is staff cross-trained to perform tasks outside of their assigned job duties, such as housekeeping staff trained to provide feeding assistance or nursing assistants trained to provide activities	○	○	○	○	○
c. Is staff, other than activity and management staff, involved in planning social events?	○	○	○	○	○
d. In the past 12 months, have nurses been scheduled to work who are employed by an agency rather than employed by your facility?	○	○	○	○	○
e. Do staff teams create their own work schedules for their units (that is, schedule days and hours to work)?	○	○	○	○	○
f. Are new staff and residents formally introduced to each other?	○	○	○	○	○

13. For this question, **leaders** refer to the Administrator, Director of Nursing, and Department Heads. **Staff** refers to all non-management employees of the facility in all departments

    Please indicate how often each of the following takes place at your facility. *(Please select <u>one</u> response in each row)*

	Rarely	Some-times	Often	Almost always	Not applica-ble
a. Are facility-wide management decisions made by leaders exclusively?	○	○	○	○	○
b. Are scheduling changes made so staff can attend professional development or advancement activities?	○	○	○	○	○
c. Do leaders tell staff why their suggestions were not implemented?	○	○	○	○	○
d. Do staff receive annual training in person-centered care or culture change?	○	○	○	○	○
e. Do staff substitute for leaders in representing the facility to the external community, such as at meetings, presentations, and promotional activities	○	○	○	○	○

14. The next questions are specifically about nursing assistants. **Nursing assistants** refer to those direct- care workers who provide hands-on personal care.

    Please indicate how often **nursing assistants** at your facility do each of the following. *(Please select <u>one</u> response in each row)*

	Never	Some-times	Often	Always	Not applica-ble
a. Do nursing assistants take part in quality improvement teams?	○	○	○	○	○
b. Do nursing assistants attend resident care plan meetings?	○	○	○	○	○
c. Do nursing assistants know when a resident's care plan has changed?	○	○	○	○	○
d. Are changes in residents' care made as a result of nursing assistants' input?	○	○	○	○	○
e. Does your facility permit nursing assistants to choose which residents they care for?	○	○	○	○	○
f. Do nursing assistants work with the same residents?	○	○	○	○	○
g. Do nursing assistants alter their work priorities to meet residents' needs	○	○	○	○	○
h. Do nursing assistants communicate with family members to convey or obtain information about residents?	○	○	○	○	○
i. Does your facility give bonuses, raises, or other rewards to nursing assistants who receive extra training or education?	○	○	○	○	○

15. Please indicate how often each of the following takes place at your facility. *(Please select <u>one</u> response in each row)*

	Rarely	Some-times	Often	Almost always	Not applicable
a. Do nursing assistants participate in formal processes that allow them to contribute ideas on improving resident care?	○	○	○	○	○
b. Do nursing assistants participate in conducting in-service education of facility staff?	○	○	○	○	○
c. Are new nursing assistants assigned to a peer mentor?	○	○	○	○	○
d. Do nursing assistants participate in hiring decisions of new staff?	○	○	○	○	○
e. Do supervisors “pitch in” to assist nursing assistants when they get busy?	○	○	○	○	○

The next section will ask you about care practices of your facility.

Please answer the questions based on the situation for your facility's **long-stay skilled residents.** Do not consider your short-stay, independent or assisted living residents.

16. For each of the following statements, please indicate if this is your facility's practice now. *(Please select one response in each row)*

	Yes	No	We are working on this
a. Residents choose the times they prefer to eat?	○	○	○
b. Residents choose when they want to get up in the morning?	○	○	○
c. Residents choose the time of day they want to bathe?	○	○	○
d. Residents choose the way they bathe, such as shower, bed bath, or bathtub?	○	○	○
e. Residents participate in choosing the types of activities that are offered to them?	○	○	○
f. Residents participate in deciding which nursing assistants are assigned to care for them?	○	○	○
g. Residents participate in developing their care plan?	○	○	○
h. Residents participate in the hiring of new nursing assistants?	○	○	○
i. Residents with memory problems have special activities designed for them?	○	○	○
j. Residents or their family members are provided with opportunities to express their preferences about end-of-life care?	○	○	○

The next section will ask you about family and community engagement of your facility.

Please answer the questions based on the situation for your facility's **long-stay skilled residents.** Do not consider your short-stay, independent or assisted living residents.

17. For these questions, **Family** refers to persons of importance to residents, such as friends, spouses, partners, children or other family members.

    Please indicate how often your facility does each of the following. *(Please select one response in each row)*

	Rarely	Some-times	Often	Almost always
a. Schedule care plan conferences when family members can attend them, including evenings?	○	○	○	○
b. Allow family members to visit loved ones anytime (i.e., 24/7)?	○	○	○	○
c. Inform family members about changes the facility is making to improve its quality?	○	○	○	○
d. Ask family members for input when the facility is considering changing facility-wide care practices?	○	○	○	○
e. Formally introduce family members to the nursing assistants taking care of their loved ones?	○	○	○	○
f. Notify family members when there is a change in the nursing assistants who care for their loved ones?	○	○	○	○

18. For these questions, **Community Members** refer to individuals not employed or contracted by your facility. Examples include neighboring businesses and individuals, a business person or lawyer, a researcher, an educator or a healthcare provider in the community.

Please indicate how often your facility does each of the following. *(Please select <u>one</u> response in each row)*

	Rarely	Sometimes	Often	Almost always
a. Have community members participate in facility activities such as movies, parties, or exercise programs?	○	○	○	○
b. Include community members on facility committees other than the Board of Directors?	○	○	○	○
c. Have community members lead resident activities such as discussion groups or lectures?	○	○	○	○
d. Ask for community members' input when the facility is considering new initiatives?	○	○	○	○

The next section will ask you about end-of-life care of your facility.

Please answer the questions based on the situation for your facility's **long-stay skilled residents.** Do not consider your short-stay, independent or assisted living residents.

19. Please indicate how often your facility might engage in the following activities when a resident is dying or has died. *(Please select one response in each row)*

	Rarely	Some-times	Often	Always	Not applica-ble
a. Discuss a resident's spiritual needs at care planning conferences when the resident has an acute or chronic terminal illness?	○	○	○	○	○
b. Document in the care plan of a terminally ill resident what is important to the individual at the end of life, such as the presence of family or religious or cultural practices?	○	○	○	○	○
c. Have a room available to provide special accommodations, such as a private room or a bed for a loved one, when a resident is actively dying?	○	○	○	○	○
d. Honor in some public way (either at the facility or in the community) a resident who has died?	○	○	○	○	○
e. Honor the resident's body in some manner upon its removal from the facility?	○	○	○	○	○
f. Send a sympathy card to family members or significant others after a resident has died?	○	○	○	○	○
g. Follow up with roommate(s) or friend(s) in the facility to provide emotional support after a resident has died?	○	○	○	○	○

The next question will ask you about the overall implementation of culture change practices in your facility.

Please answer the questions based on the situation for your facility's **long-stay skilled residents.** Do not consider your short-stay, independent or assisted living residents.

20. **Culture Change** is an effort to make a facility less like an institution and more like a home. Core values include: choice for residents, improving quality of care, staff empowerment, and creating a homelike setting.

    Please indicate which statement best reflects your nursing home's involvement in culture change or resident-centered care. *(Please select one answer)*

○ There is no discussion around culture change

○ Culture change is under discussion, but we haven't changed the way we take care of residents

○ Culture change has partially changed the way we care for residents in some or all areas of the organization

○ Culture change has completely changed the way we take care of residents in some areas of the organization

○ Culture change has completely changed the way we take care of residents in all areas of the organization

○ Other (please explain) _____

Next, we would like to ask some other information about your facility.

21. What is the name of your facility?

_____

22. What is the zip code of the location of your facility?

_____

23. Is your facility certified or registered as any of the existing culture change models and when your nursing home initiated the model (Please check all that apply):

☐ Wellspring, since (which year)
_____

☐ Eden Alternative, since (which year)
_____

☐ The Green House Model, since (which year)
_____

☐ Planetree, since (which year)
_____

☐ Household Model by Action Pact, since (which year)
_____

☐ Other (please specify), since (which year)
_____

24. Has your facility ever been part of the Minnesota Department of Human Services Performance-based Incentive Payment Program (PIPP)?

○ Yes (Please continue with Question 25 & 26)

○ No (Please go to question 27)

25. In which year(s) was your nursing home part of the PIPP?

_____

26. Did your PIPP project target one or more culture change practices?

○ Yes

○ No

In the following questions, we would like to ask some information about you.

27. What is your position in the facility?

○ Administrator

○ Direction of nursing

○ Other (please specify) _____

28. How many years have you been working at this facility?

_____

29. How many years have you been in your current position at this facility?

_____

30. How many years have you worked within nursing facilities in total?

_____

In the last section, we would like you to share other information and your thoughts about culture change practices in your facility. Please take your time to answer them.

31. Please describe any other strategies your facility has implemented or is implementing to facilitate culture change practices.

_____

_____

_____

_____

_____

32. Please describe any challenges in promoting or facilitating culture change practices your facility has faced or is facing.

_____

_____

_____

_____

_____

33. Please feel free to share any other thoughts about culture change practices (e.g. lesson learned, visions, etc.)

_____

_____

_____

_____

_____

Thank you for your time in completing this survey!

Appendix B Resident Quality of Life Survey

MINNESOTA DEPARTMENT OF HUMAN SERVICES
RESIDENT QUALITY OF LIFE
INTERVIEW FORM 2016

INTERVIEW DETAILS

Today's Date:_____ **Resident ID:**_____ Resident Gender: O Male O Female

Facility ID:_____ Admission Date:_____

Interviewer ID:_____

Start Time 1:_____ : _____ am / pm
Hr Min

End Time 1:_____ : _____ am / pm
Hr Min

Mark only if interview was interrupted and re-started

Start Time 2: _____ : _____ am / pm
Hr Min

End Time 2: _____ : _____ am / pm
Hr Min

INTERVIEW STATUS

O Not Interviewed
O Incomplete
O Complete

Reason why resident was not interviewed (if applicable)
O Guardian Refusal
O Isolation
O Deceased
O Discharged/Moved
O Hospitalized/Ill
O Out of facility
O Unable to locate
O Asleep (when visited 3 times)
O Language barrier
O Unable to respond to questions
O Refused
O Other

Reason why interview is incomplete (if applicable)
O Resident fatigue
O No response to 4 questions in a row
O Resident wanted to stop
O Clinical care
O Resident illness
O Other

Assistance with interview (if applicable)
O Family member
O Volunteer
O Staff member
O Custodian/Guardian
O Other

MEANINGFUL ACTIVITIES

FIRST, I HAVE A FEW QUESTIONS ABOUT HOW YOU SPEND YOUR TIME.	Generally, Yes	Generally, No	DK/NA/NR
1. Do you have something to look forward to most days?	O	O	O
2. Are there things to do on the weekend that you enjoy?	O	O	O
3. Are you given the chance to do things that are meaningful to you? *(Probe: things that are important to you, things that matter)*	O	O	O
4. Are there enough scheduled activities?	O	O	O
5. Do you like the activities that are scheduled here?	O	O	O

1

FOOD ENJOYMENT

THE NEXT FEW QUESTIONS ARE ABOUT THE FOOD AND MEALTIMES.	Generally, Yes	Generally, No	DK/NA/NR
6. Do you like the food here?	O	O	O
7. Do you get your favorite foods here?	O	O	O
8. Does the menu change enough?	O	O	O
9. Do you enjoy mealtimes here?	O	O	O

ENVIRONMENT

THE NEXT QUESTIONS ARE ABOUT THE ENVIRONMENT HERE.	Generally, Yes	Generally, No	DK/NA/NR
10. Is it easy for you to get around in your room?	O	O	O
11. Can you get to the things you need in your room?	O	O	O
12. Does noise keep you awake at night?*	O	O	O
13. Can you enjoy the outdoors when you want to?	O	O	O
14. Can you find a place to be alone when you want to be alone?	O	O	O
15. Do you feel you have enough privacy? *(Probe: to have a conversation, meet with visitors, do things by yourself?)*	O	O	O
16. Are your personal items safe here?	O	O	O
17. Do you feel safe here?	O	O	O

DIGNITY

THE NEXT FEW QUESTIONS ARE ABOUT THE PEOPLE WHO WORK HERE.	Generally, Yes	Generally, No	DK/NA/NR
18. Do the people who work here treat you politely?	O	O	O
19. Do the people who work here listen to you?	O	O	O
20. Do the people who work here give you enough time to do the things you can do for yourself? *(Probe: getting dressed, grooming, moving around)*	O	O	O
21. Are the people who work here gentle with your care?	O	O	O
22. Do the people who work here respect your modesty? *(Probe: avoid exposing your body more than needed)*	O	O	O

AUTONOMY

THE NEXT QUESTIONS ARE ABOUT THE CHOICES YOU HAVE HERE.	Generally, Yes	Generally, No	DK/NA/NR
23. Can you get up in the morning at the time you want?	○	○	○
24. Do the people who work here do things the way you want them done? *(Probe: clean your room properly, give you the type of bath you like, prepare your coffee the way you like it)*	○	○	○
25. Are you encouraged to speak up about things you don't like here? *(Probe: your bathing schedule, the food, your room)*	○	○	○
26. Are your concerns taken care of in a timely way?	○	○	○

RELATIONSHIPS

I HAVE A FEW MORE QUESTIONS ABOUT THE PEOPLE HERE.	Generally, Yes	Generally, No	DK/NA/NR
27. Do the people who work here ever stop by just to talk?	○	○	○
28. Do the people who work here talk with you about things that are important to you?	○	○	○
29. Do the people who work here seem happy to work here?	○	○	○
30. Are you friends with anyone who lives here? *(Probe: Is there anyone you enjoy spending time with?)*	○	○	○

CAREGIVING

THE NEXT GROUP OF QUESTIONS IS ABOUT THE CARE YOU GET HERE.	Generally, Yes	Generally, No	DK/NA/NR
31. Do you get help when you need it in a timely way?	○	○	○
32. Do the people who work here tell you what they are doing when they care for you? *(Probe: explain what is going to happen, tell you what is coming next)*	○	○	○
33. Do the people who work here check often enough to see if you need anything?	○	○	○
34. Do the people who work here ask to come in before entering your room? *(Probe: they knock, or call your name and ask if they can come in)*	○	○	○
35. Do the same people take care of you most of the time?	○	○	○
36. Do the people who work here ever get angry at you?*	○	○	○
37. Do the people who work here go above and beyond to give you a good life?	○	○	○
38. Would you recommend [Name of Facility] to someone who needs care?	○	○	○

THE NEXT QUESTION IS ABOUT HOW YOU FEEL ABOUT [Name of Facility] OVERALL.

39. Overall, what grade would you give [Name of Facility], [pause] where A is the best it could be and F is the worst it could be? *(Probe: Think of grades in school where A is the highest grade and F is the lowest grade.)*	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓕ	○

[Show answer choice card **after** posing this question. Read all choices aloud].

MOOD

THE LAST FEW QUESTIONS ARE ABOUT HOW YOU'VE BEEN FEELING. AFTER ASKING EACH QUESTION I WILL ASK YOU TO CHOOSE YOUR ANSWER FROM: OFTEN, SOMETIMES, RARELY OR NEVER.

In the past two weeks, how often have you felt... [Show answer choice card after posing the question. Read all choices aloud].	OFTEN	SOME-TIMES	RARELY	NEVER	DK/NA/NR
40. Bored	○	○	○	○	○
41. Angry	○	○	○	○	○
42. Peaceful or Calm *(Probe: Relaxed)*	○	○	○	○	○
43. Worried	○	○	○	○	○
44. Interested in things *(Probe: going on here and in the outside world)*	○	○	○	○	○
45. Sad or Unhappy	○	○	○	○	○
46. Afraid	○	○	○	○	○
47. Lonely	○	○	○	○	○
48. Happy	○	○	○	○	○

THOSE ARE ALL THE QUESTIONS I HAVE ABOUT THIS FACILITY.

THANK YOU VERY MUCH FOR ANSWERING MY QUESTIONS.

GO TO THE FIRST PAGE AND RECORD INTERVIEW STATUS AND INTERVIEW END TIME.

Appendix C Family Satisfaction Survey

MARKING INSTRUCTIONS

- Do not use pens with ink that soaks through the paper.
- Make solid marks that fill the circle completely.
- Make no stray marks on this form.
- Do not fold, tear, or mutilate this form.

Instructions: Use pen (blue or black ink) only.
Like this: ● Not like this: Ⓘ ⊗

Please mark only one answer choice per question.

1. What is your relationship to the resident at the nursing facility?

- ○ Spouse
- ○ Child
- ○ Son-in-law or Daughter-in-law
- ○ Sibling
- ○ Other relative or friend
- ○ Guardian/Conservator/Power of Attorney/Case Manager

2. Are you male or female?

- ○ Male
- ○ Female

3. About how often do you visit the resident?

- ○ Once a week or more
- ○ A couple times a month
- ○ About once a month
- ○ Less than once a month

4. About how often do you communicate with the resident via telephone, email, text, etc?

- ○ Once a week or more
- ○ A couple times a month
- ○ About once a month
- ○ Less than once a month
- ○ Not Applicable – The resident is unable to communicate via telephone, email, text, etc.

Please tell us about your experiences with the nursing facility and the care given there. Please grade each of the following items where A=excellent, B=very good, C=average, D=below average, and F=failing.	Excellent **A**	Very Good **B**	Average **C**	Below Average **D**	Failing **F**	Don't Know/Not Applicable **NA**
5. Comfort of the resident's room	○	○	○	○	○	○
6. Respect for the resident's dignity	○	○	○	○	○	○
7. Staff's attitude towards the resident (respect, concern, caring)	○	○	○	○	○	○
8. Quality of food served to the resident	○	○	○	○	○	○
9. Menu choice of food available to the resident	○	○	○	○	○	○
10. Atmosphere at meal time	○	○	○	○	○	○
11. Personal care and attention given to the resident	○	○	○	○	○	○
12. Offering activities that are interesting to the resident	○	○	○	○	○	○
13. Being able to see professional nurses when needed	○	○	○	○	○	○
14. Being able to see physicians when needed	○	○	○	○	○	○
15. Having the same staff assigned consistently	○	○	○	○	○	○
16. Having staff who know the resident	○	○	○	○	○	○
17. Having staff who like the resident	○	○	○	○	○	○
18. Staff doing what they say they will do	○	○	○	○	○	○
19. Staff respect for the resident's privacy	○	○	○	○	○	○
20. Cleanliness of the facility	○	○	○	○	○	○
21. Smell of the facility	○	○	○	○	○	○
22. Resident safety	○	○	○	○	○	○
23. Communicating with you about the resident's health status	○	○	○	○	○	○
24. Making the nursing facility a pleasant place to visit	○	○	○	○	○	○
25. Making you feel welcome when you visit	○	○	○	○	○	○

	Excellent A	Very Good B	Average C	Below Average D	Failing F	Don't Know/Not Applicable NA
26. Including your thoughts and opinions in planning the resident's care	○	○	○	○	○	○
27. Answering questions that you might have	○	○	○	○	○	○
28. Making you feel confident in the care the resident receives	○	○	○	○	○	○
29. Allowing you to provide help or care to the resident	○	○	○	○	○	○
30. Not counting on you to provide more help than you want to provide	○	○	○	○	○	○
31. Allowing the resident to choose to receive or refuse care	○	○	○	○	○	○
32. Staff going the extra mile to resolve problems	○	○	○	○	○	○
33. Management responding well to your concerns	○	○	○	○	○	○
34. Quality of care provided in the nursing facility	○	○	○	○	○	○
35. Quality of nursing facility as a place to live	○	○	○	○	○	○

	Extremely Confident 5	4	3	2	Not at all Confident 1
36. Rating the nursing facility on a scale where 5=**extremely confident and 1=not at all confident**, how confident are you that the resident is well cared for whether you are present or not?	○	○	○	○	○

	Extremely High 5	4	3	2	Extremely Low 1
37. Rating the nursing facility on a scale where 5=**extremely high and 1=extremely low**, how enthusiastically would you recommend this nursing facility to another family?	○	○	○	○	○

Appendix D Quality Indicators from the Minimum Data Set

Domain	Name	Description
Psychosocial	Incidence of Worsening or Serious Resident Behavior Problems (Long Stay)	This is the percent of residents with verbal, physical, or other disruptive behavior symptoms that have worsened or have stayed at the most serious level since the last assessment.
	Prevalence of Depressive Symptoms (Long Stay)	This is the percent of long-stay residents who are exhibiting signs of depression. This is determined by a standardized resident mood interview or if interview is not possible, by staff assessment.
Quality of Life	Prevalence of Physical Restraints (Long Stay)	This is the percent of long-stay residents who were physically restrained. A physical restraint is any device, material or equipment attached or adjacent to a resident's body, that a resident can't remove easily, which keeps a resident from moving freely or prevents them normal access to their body. Side rails on beds are not included in this calculation.
Continence	Incidence of Worsening or Serious Bowel Incontinence (Long Stay)	This is the percent of long-stay residents whose ability to control their bowel has gotten worse or stayed at the most serious level since the last assessment. Residents who need an appliance such as an ostomy for bowel movements are not included in the calculation of this measure.
	Incidence of Worsening or Serious Bladder Incontinence (Long Stay)	This is the percent of long stay-residents whose ability to control their bladder has gotten worse or stayed at the most serious level since the last assessment. Residents who need an appliance such as catheter for urination are not included in the calculation of this measure.
	Prevalence of Occasional to Full Bladder Incontinence Without a Toileting Plan (Long Stay)	This is the percent of long-stay residents who lose control of their bladder and are not on a documented individualized bladder toileting program.
	Prevalence of Occasional to Full Bowel Incontinence Without a Toileting Plan (Long Stay)	This is the percent of long-stay residents who lose control of their bowel and are not on a documented individualized bladder toileting program.
	Prevalence of Indwelling Catheters (Long Stay)	This is the percent of long-stay residents who had a catheter inserted and left in their bladder for a period of time.
Infections	Prevalence of Urinary Tract Infections (Long Stay)	This is the percent of long-stay residents who had an infection in their urinary tract.
	Prevalence of Infections (Long Stay)	This is the percent of long-stay residents who have had an infection. This may include drug-resistant infections, some wound infections, pneumonia, viral hepatitis, and septicemia.
Domain	**Name**	**Description**

Accidents	Prevalence of Falls with Major Injury (Long Stay)	This is the percent of long-stay residents who have experienced one or more falls with major injury (e.g. bone fractures, joint dislocations, closed head injuries with altered consciousness, subdural hematoma).
Nutrition	Prevalence of Unexplained Weight Loss (Long Stay)	This is the percent of long-stay residents who have lost too much weight and are not on a physician-prescribed weight loss regimen.
Skin Care	Prevalence of New or Worsening Pressure Sores (Short Stay)	This is the percent of short-stay residents (recently admitted to the nursing home after a hospitalization) who have developed pressure sores or who had pressure sores that got worse since admission.
	Prevalence of Pressure Sores in High-Risk Residents (Long Stay)	This is the percent of long-stay residents with a high risk for getting pressure sores that have one or more pressure sores. Residents are defined as high risk if they are comatose, malnourished , or have an impaired ability to move themselves in bed or transfer from bed to chair, etc.
Psychotropic Drugs	Prevalence of Antipsychotics Without a Diagnosis of Psychosis (Long Stay)	This is the percent of long-stay residents who receive an antipsychotic medication. Some residents with a serious mental illness diagnosis such as Schizophrenia are not included in the calculation of this measure.
Physical Functioning	Incidence of Worsening or Serious Functional Dependence (Long Stay)	This is the percent of long-stay residents whose need for help doing basic tasks has increased or stayed at the highest level since the last assessment. These tasks include feeding oneself, moving from one chair to another, changing positions in bed and/or going to the bathroom. Residents with quadriplegia are not included in the calculation of this measure.
	Incidence of Walking as Well or Better than Previous Assessment (Long Stay)	This is the percent of long-stay residents who have the same or improved independence in walking ability since the last assessment.
	Incidence of Worsening or Serious Mobility Dependence (Long Stay)	This is the percent of long-stay residents whose need for help moving in and around their room has increased or stayed at the highest level since the last assessment. Residents with quadriplegia are not included in the calculation of this measure.
	Incidence of Worsening or Serious Range of Motion Limitation (Long Stay)	This is the percent of long-stay residents whose ability to move the joints of their upper or lower extremities has declined or stayed at the lowest level since the last assessment. Residents with quadriplegia are not included in the calculation of this measure

Domain	Name	Description
Pain	Prevalence of Residents who Report Moderate to Severe Pain (Short Stay)	This is the percent of short-stay residents (recently admitted to the nursing home following a hospital stay) who report having moderate to severe pain. Although pain is common during recovery and rehabilitation from a major illness or injury, it is still important to identify and treat pain.
	Prevalence of Residents who Report Moderate to Severe Pain (Long Stay)	This is the percent of long-stay residents who reported having moderate to severe pain.

Appendix E Pre-notice Letter on the Culture Change Survey

Dear Nursing Home Administrator:

I am a PhD candidate from University of Minnesota School of Nursing. I am working on a research project about **nursing home culture change** and its effect on residents' quality of life. Culture change in nursing home is a broad-based effort which aims at transforming nursing home from an institution to a genuine home. My faculty and research advisor is Dr. Christine Mueller (cmueller@umn.edu).

I would like to invite you to complete an online survey about the implementation of culture change practices in your nursing home. In the next week, you will receive an email with a survey link attached. Your unique role as a leader makes you the most suited person to share the experience of the culture change journey taking place in your nursing home. Your assistance in completing this survey will be instrumental in advancing our understanding of culture change practices and its impact on residents' quality of life in Minnesota nursing homes.

Thank you in advance and hope that you will enjoy this opportunity to share your experience!

Sincerely,

Yinfei Duan

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PhD Candidate, School of Nursing
University of Minnesota
Email: duanx152@umn.edu
Phone: 612-308-9224
Address: 5-140 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455

Appendix F Invitation letter to the Culture Change Survey

Dear Nursing Home Administrator:

I am a PhD candidate from University of Minnesota School of Nursing. I am working on a research project about **nursing home culture change** and its effect on residents' quality of life. Culture change in nursing home is a broad-based effort which aims at transforming nursing home from an institution to a genuine home. My faculty and research advisor is Dr. Christine Mueller (cmueller@umn.edu).

I would like to invite you to take a survey about the implementation of culture change practices in your nursing home. Your unique role as a leader makes you the most suited person to share the experience of the culture change journey taking place in your nursing home. Your assistance in completing this survey will be instrumental in advancing our understanding of culture change practices and its impact on residents' quality of life in Minnesota nursing homes.

Upon the completion of this online survey, you will receive **an individualized report** comparing your results with the aggregate results of all the other nursing homes in Minnesota that participate in this study. This will enable you to identify where your nursing home is in the culture change journey compared to others and take corresponding actions to promote and enhance culture change practices in your nursing home. In addition, you will have a chance to be one of 5 respondents who win **a $50 Amazon gift card**.

This survey will take about 15-20 minutes and is completely confidential. Your survey results will be only viewed by me and my research advisor. Completing the survey is voluntary, and your completion will serve as your consent. This project has obtained approval from the Institutional Review Board in the University of Minnesota (email: irb@umn.edu; phone: 612-626-5654). If you have any questions, please contact me (see the contact information below).

I appreciate your time in completing this survey!

Sincerely,
Yinfei Duan

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PhD Candidate, School of Nursing
University of Minnesota
Email: duanx152@umn.edu
Phone: 612-308-9224
Address: 5-140 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455

Appendix G IRB Decision Letter

UNIVERSITY OF MINNESOTA

Twin Cities Campus

Human Research Protection Program
Office of the Vice President for Research

D528 Mayo Memorial Building
420 Delaware Street S.E.
MMC 820
Minneapolis, MN 55455

Phone: 612-626-5654
Fax: 612-626-6061
Email: irb@umn.edu
http://www.research.umn.edu/subjects/

NOT HUMAN RESEARCH

June 13, 2018

Christine Mueller

612-626-4922
cmueller@umn.edu

Dear Christine Mueller:

On 6/13/2018, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Nursing Home Culture Change and its Effect on Quality of Life for Residents
Investigator:	Christine Mueller
IRB ID:	STUDY00003659
Sponsored Funding:	None
Grant ID:	None
Internal UMN Funding:	None
Fund Management Outside University:	None
IND, IDE, or HDE:	None
Documents Reviewed with this Submission:	• Duan_Yinfei_Instrument, Category: Other; • Duan_Yinfei_Recruitment, Category: Recruitment Materials; • Duan_Yinfei_HRP-503, Category: IRB Protocol

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations. To arrive at this determination, the IRB used "WORKSHEET: Human Research (HRP-310)." If you have any questions about this determination, please review that Worksheet in the HRPP Toolkit Library and contact the IRB office if needed.

Ongoing IRB review and approval for this activity is not required; however, this determination applies only to the activities described in the IRB submission and does not

apply should any changes be made. If changes are made and there are questions about whether IRB review is required, please submit a Modification to the IRB for a determination.

Sincerely,

Clinton Dietrich, MA, CIP
IRB Analyst

We value feedback from the research community and would like to hear about your experience. The link below will take you to a brief survey that will take a minute or two to complete. The questions are basic, but your responses will help us better understand what we are doing well and areas that may require improvement. Thank you in advance for completing the survey.

Even if you have provided feedback in the past, we want and welcome your evaluation.

https://umn.qualtrics.com/SE/?SID=SV_5BiYrqPNMJRQSBn

Appendix H Item Scores of the Culture Change Survey

Physical Environment

Survey Items	n	Percentages of Responses [Point Value Assigned]				
		Neither [NA*]	*Households Only* [NA*]	*Small Homes or Both* [NA*]	*Yes* [0]	*No* [1]
Small Homes / Households *Item Comprised of Two Questions from Survey...* 1. Do any of your residents live in Households that include kitchen and dining facilities? 2. Do any of your residents live in Small Homes that include private bedrooms, kitchens, dining rooms, and common living areas?	102	65.7	31.4	2.9		
Do any of your rooms have a bathroom (that is, a toilet and sink) that is shared by 3 or more residents?					18.6	81.4
		0% [0]	*1 to 4% [0]*	*5 to 25% [0*	*26 to 75% [1]*	*76 to 100% [1]*
What percent of your residents has a private room?	102	2.9	7.8	14.7	31.4	43.1

*Item not included in calculation of index score

Survey Items	*n*	*Percentages of Responses [Point Value Assigned]*		
Please indicate if each of the following Statements applies to your facility.		*No [0]*	*We are Working on This [0]*	*Yes [1]*
The lighting, furniture, and overall environment in residents' living areas are similar to what we would use in our own homes	101	17.8	13.9	68.3
We have indoor and/or outdoor play areas for children	102	75.5	5.9	18.6
Residents who are mobile (with or without assistive devices) can come and go freely in our facility's outdoor spaces	102	3.9	2.0	94.1
We have eliminated nursing stations	102	77.5	6.9	15.7
We have kitchen areas that are accessible to residents and families 24/7	102	32.4	2.9	64.7
We use open dining where a meal is available for at least a two hour period during which residents can choose when to eat	102	36.3	9.8	53.9
All residents can keep their doors closed or open, as they prefer	102	2.0	0.0	98.0
We display residents' personal items, such as family photos, in common living areas outside of their rooms	102	56.9	2.0	41.2
We have a communication system in place that we use as an alternative to overhead paging	102	6.9	8.8	84.3
Noise at night is reduced	102	6.9	10.8	82.4
		No [NA*]	*We are Working on This* [NA*]	*Yes* [NA*]
We provide or coordinate free transportation for individual residents to go out for non-medical reasons, such as to local stores of their choice or social visits to friends or family		47.5	11.9	40.6

*Item not included in calculation of the index score

Staff Empowerment

Survey Items	n	Percentages of Responses [Point Value Assigned]			
In your facility, how often…		*Never [0]*	*Sometimes [0]*	*Often [1]*	*Always [2]*
Does staff work together to cover shifts when someone can't come to work?	102	1.0	14.7	41.2	43.1
Is staff cross-trained to perform tasks outside of their assigned job duties, such as housekeeping staff trained to provide feeding assistance or nursing assistants trained to provide activities?	99	27.3	47.5	14.1	11.1
Is staff, other than activity and management staff, involved in planning social events?	102	15.7	51.0	20.6	12.8
Do staff teams create their own work schedules for their units (that is, schedule days and hours to work)?	100	81.0	14.0	4.0	1.0
Are new staff and residents formally introduced to each other?	102	9.8	34.3	29.4	26.5
Do nursing assistants take part in quality improvement teams?	97	7.2	30.9	37.1	24.7
Do nursing assistants attend resident care plan meetings?	97	35.1	35.1	16.5	13.4
Do nursing assistants know when a resident's care plan has changed?	97	0.0	7.2	28.9	63.9
Are changes in residents' care made as a result of nursing assistants' input?	97	1.0	16.5	52.6	29.9
Does your facility permit nursing assistants to choose which residents they care for?	96	30.2	59.4	10.4	0.0
Do nursing assistants alter their work priorities to meet residents' needs?	96	1.0	16.7	67.7	14.6
Do nursing assistants communicate with family members to convey or obtain information about residents?	97	3.1	46.4	43.3	7.2
Does your facility give bonuses, raises, or other rewards to nursing assistants who receive extra training or education?	96	35.4	34.4	14.6	15.6

	n	*Never* [NA*]	*Sometimes* [NA*]	*Often* [NA*]	*Always* [NA*]
In the past 12 months, have nurses been scheduled to work who are employed by an agency rather than employed by your facility?	102	61.8	23.5	12.8	2.0
Do nursing assistants work with the same residents?	97	0.0	12.4	75.3	12.4

*Item not included in calculation of the index score

Staff Leadership

Survey Items	n	Percentages of Responses [Point Value Assigned]			
In your facility, how often…		*Rarely* [0]	*Some-times* [0]	*Often* [1]	*Almost Always* [2]
Do nursing assistants participate in formal processes that allow them to contribute ideas on improving resident care?	96	10.4	33.3	37.5	18.8
Do nursing assistants participate in conducting in-service education of facility staff?	95	42.1	28.4	22.1	7.4
Are new nursing assistants assigned to a peer mentor?	94	19.2	14.9	23.4	42.6
Do nursing assistants participate in hiring decisions of new staff?	94	61.7	29.8	5.3	3.2
Do supervisors "pitch in" to assist nursing assistants when they get busy?	97	3.1	18.6	44.3	34.0
Are scheduling changes made so staff can attend professional development or advancement activities?	99	1.0	19.2	40.4	39.4
Do leaders tell staff why their suggestions were not implemented?	101	3.0	27.7	43.6	25.7
Do staff receive annual training in person-centered care or culture change?	99	8.1	10.1	23.2	58.6
Do staff substitute for leaders in representing the facility to the external community, such as at meetings, presentations, and promotional activities?	101	32.7	37.6	24.8	5.0
		Rarely [2]	*Some-times [1]*	*Often [0]*	*Almost Always [0]*
Are facility-wide management decisions made by leaders exclusively?	101	9.9	35.6	33.7	20.8

Resident Centered Care

Survey Items	n	Percentages of Responses [Point Value Assigned]		
At the present time, is it the practice in your facility that…		*No [0]*	*Working on This [0]*	*Yes [1]*
Residents choose the times they prefer to eat?	95	13.7	25.3	61.1
Residents choose when they want to get up in the morning?	96	2.1	10.4	87.5
Residents choose the time of day they want to bathe?	96	6.3	13.5	80.2
Residents choose the way they bathe, such as shower, bed bath, or bathtub?	96	2.1	3.1	94.8
Residents participate in choosing the types of activities that are offered to them?	95	2.1	5.3	92.6
Residents participate in deciding which nursing assistants are assigned to care for them?	96	55.2	15.6	29.2
Residents participate in developing their care plan?	96	7.3	6.3	86.5
Residents participate in the hiring of new nursing assistants?	96	88.5	6.3	5.2
Residents with memory problems have special activities designed for them?	96	5.2	9.4	85.4
		No [NA]*	*We are Working on This [NA*]*	*Yes [NA*]*
Residents or their family members are provided with opportunities to express their preferences about end-of-life care?	96	0.0	0.0	100.0

*Item not included in calculation of the index score

Family and Community Engagement

Survey Items	n	Percentages of Responses [Point Value Assigned]			
How often does your facility…		*Rarely* [0]	*Some-times* [0]	*Often* [1]	*Almost Always* [2]
Schedule care plan conferences when family members can attend them, including evenings?	94	5.3	19.2	27.7	47.9
Inform family members about changes the facility is making to improve its quality?	94	1.1	20.2	43.6	35.1
Ask family members for input when the facility is considering changing facility-wide care practices?	94	22.3	36.2	30.9	10.6
Formally introduce family members to the nursing assistants taking care of their loved ones?	94	24.5	29.8	37.2	8.5
Notify family members when there is a change in the nursing assistants who care for their loved ones?	94	56.4	28.7	11.7	3.2
Have community members participate in facility activities such as movies, parties, or exercise programs?	94	12.8	38.3	40.4	8.5
Include community members on facility committees other than the Board of Directors?	94	53.2	29.8	10.6	6.4
Have community members lead resident activities such as discussion groups or lectures?	94	22.3	47.9	26.6	3.2
Ask for community members' input when the facility is considering new initiatives	94	50.0	27.7	18.1	4.3
		Rarely [NA*]	*Sometimes* [NA*]	*Often* [NA*]	*Almost Always* [NA*]
Allow family members to visit loved ones anytime (i.e., 24/7)?	94		1.1	6.4	92.6

*Item not included in calculation of the index score

End-of-Life

Survey Items	n	Percentages of Responses [Point Value Assigned]			
How often does your facility…		*Rarely* [0]	*Sometimes* [0]	*Often* [1]	*Almost Always* [2]
Discuss a resident's spiritual needs at care planning conferences when the resident has an acute or chronic terminal illness?	92	1.1	5.4	19.6	73.9
Document in the care plan of a terminally ill resident what is important to the individual at the end of life, such as the presence of family or religious or cultural practices?	93	0.0	7.5	18.3	74.2
Honor in some public way (either at the facility or in the community) a resident who has died?	93	5.4	11.8	9.7	73.1
Honor the resident's body in some manner upon its removal from the facility?	93	28.0	6.5	8.6	57.0
Send a sympathy card to family members or significant others after a resident has died?	92	1.1	6.5	12.0	80.4
Follow up with roommate(s) or friend(s) in the facility to provide emotional support after a resident has died?	92	2.2	9.8	28.3	59.8
		Rarely [NA]*	*Sometimes [NA*]*	*Often [NA*]*	*Almost Always [NA*]*
Have a room available to provide special accommodations, such as a private room or a bed for a loved one, when a resident is actively dying?	90	8.9	15.6	18.9	56.7

*Item not included in calculation of the index score

Appendix I Comparison of Original Culture Change Domain Scores Between Nursing Homes (NHs) in Minnesota and NHs in a National Representative Sample

	NHs in Minnesota			NHs in a national representative sample			Mean difference	Equal variance			Unequal variance t		
	Mean	SD	n	Mean	SD	n		t	p	95% CI	t	p	95% CI
Physical environment	19.78	1.76	102	17.91	19.87	1460	1.87	0.95	0.34	(0.79, 2.95)	3.41	<0.001	(0.79, 2.95)
Resident-centered care	23.07	4.41	97	23.58	4.53	1423	-0.51	-1.04	0.30	(-1.45, 0.43)	-1.06	0.29	(-1.46, 0.44)
Staff empowerment	17.97	3.47	97	18.27	3.75	1407	-0.30	-0.72	0.47	(-1.06, 0.46)	-0.77	0.44	(-1.07, 0.47)
Staff leadership	15.22	1.55	96	14.86	1.92	1477	0.36	1.78	0.075	(0.03, 0.69)	2.15	0.03	(0.03, 0.70)
Family and community engagement	14.02	3.39	94	14.80	3.84	1474	-0.78	-1.92	0.05	(-1.49, -0.07)	-2.14	0.03	(1.51, -0.06)
End-of-life care	15.33	2.72	93	13.70	2.95	1356	1.63	5.10	<0.001	(1.05 ,2.21)	5.48	<0.001	(1.04, 2.22)

Note: original culture change domain scores of NHs in a national representative sample were obtained from:

- Miller, S. C., Schwartz, M. L., Lima, J. C., Shield, R. R., Tyler, D. A., Berridge, C. W., ... & Clark, M. A. (2018). The Prevalence of Culture Change Practice in US Nursing Homes. Medical care, 56(12), 985-993.
- Schwartz, M. L., Lima, J. C., Clark, M. A., & Miller, S. C. (2019). End-of-Life Culture Change Practices in US Nursing Homes in 2016/2017. *Journal of Pain and Symptom Management*, *57*(3), 525-534.